NASA Contractor Report 178217

Flight Survey of the 757 Wing Noise Field And Its Effects on Laminar Boundary Layer Transition

Volume II — Data Compilation

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Boeing Commercial Airplane Company
P.O. Box 3707, Seattle, WA 98124

Contract NAS1-15325
March 1987

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER

FOREWORD

This report presents the results of the 757 Wing Noise Survey and Glove Flight Test conducted under NASA Contract NAS1-15325 from November 1984 through July 1985. This work was managed by the Laminar Flow Control Project Office (LFCPO) at the NASA Langley Research Center. Mr. R. D. Wagner is Head of the LFCPO and Mr. D. B. Middleton, and Mr. D. W. Bartlett were the technical monitors for the contract.

The work was performed under the direction of the New Product Development staff of the Boeing Commercial Airplane Company. A number of organizations including the Engineering, Manufacturing, and Flight Test departments contributed to the successful completion of the total project as planned. Key contractor personnel responsible for this effort were—

C. F. Watson	Manager-NASA Programs
L. B. Gratzer	Laminar Flow Program Manager
J. H. Armstrong	757 Project Test Pilot
G. W. Bielak	Acoustics Technology
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FIGURES (Continued)

FIGURES (Concluded)

TABLES

1.0 SUMMARY

It has been previously observed that an incident acoustic field on a wing with laminar flow can cause transition to turbulent flow if the fluctuating acoustic velocities are of sufficient amplitude and in the critical frequency range for an unstable laminar boundary layer (ref. 1). Although some data on the Northrop X-21A LFC airplane have been previously taken, very little acoustic environment data measured on the wing of a modern transport aircraft are available. Accordingly, NASA awarded a contract to The Boeing Company to perform a flight test program using the Boeing 757 flight research aircraft with wing-mounted high-bypass ratio engines (PW 2037 engines) to obtain acoustic spectral data on the wing surfaces. As part of this effort, a section of the wing was modified with a natural laminar flow (NLF) glove to allow direct measurement of the effect of varying engine noise on the extent of laminar flow.

The NLF glove was installed on the right wing panel just outboard of the engine. The glove had a leading edge sweep of 21 deg, a span of approximately 10 ft, and extended chordwise about 6 ft. The glove was instrumented with hot films for measuring the extent of laminar flow, and pressure belts were used to obtain the chordwise pressure distributions at two spanwise stations. A combination of surface and probe microphones were distributed over the upper and lower wing surfaces to measure sound spectra. A range of flight conditions was selected to provide coverage of the normal cruise condition and to assess the effects of off-design operation.

The flight test program was completed in June, 1985. A maximum of about 29% chord laminar flow was obtained on the upper surface and about 28% on the lower surface. This exceeded the design objectives for the NLF glove.

At each flight condition, the engine power was varied from about 2600 r/min (idle) to about 4500 r/min (maximum continuous power). This produced changes in sound pressure level over 20 dB on the wing lower surface, depending on the proximity to the engine. On the wing upper surface, the sound pressure levels were relatively independent of engine power but did exhibit significant variations with airplane Mach number. The spectral data provides considerable insight into the influences of the various sound sources that contribute to the overall noise levels. Additional analysis will be required to assess the impact of each source on boundary layer transition.

The location of transition was affected by a number of operational parameters including Reynolds number, Mach number, C_L, and sideslip (sweep). The trends exhibited were generally in accord with those expected from analysis and other experiments. For the conditions prevailing in these tests, the effect of engine power on transition was negligible on the upper surface and small (1% - 2% chord) on the lower surface. For situations involving longer laminar runs (e.g., with HLFC) and for higher engine noise levels, significant effects of engine noise on the extent of laminar flow cannot be ruled out.

These results demonstrate that substantial laminar flow on the wing of a transport configuration with wing-mounted engines can be obtained.

2.0 INTRODUCTION

Application of a laminar flow wing design to commercial transports offers the potential of significant airplane drag reductions. However, a major concern has been whether laminar flow can be sustained in the presence of the noise environment on the wing of a commercial transport with conventional wing-mounted turbofan engines. To resolve this issue, and thereby avoid possible design limitations, it was planned to obtain flight test wing noise environment data on a current production commercial aircraft. To assess the effect of engine noise on laminar flow, it was also planned to establish an area of laminar flow on the wing and thus allow direct measurement of the effect of varying engine noise level on the extent of laminar flow.

Reference 1 provides a limited amount of one-third-octave sound pressure level data measured on a chordwise array of eight microphones installed close to the outboard engine nacelle on the wing undersurface of a 747-200 airplane. In addition, single-microphone measurements on the wing surfaces of smaller aircraft are available (ref. 6). Some sound surveys have been made on the wings of the Northrop X-21A LFC airplane (ref. 7), but these measurements were of overall sound pressures only and were obtained 12 to 18 in above and below the wing surfaces.

The 757-200 airplane is a suitable testbed for investigating the effects of noise from wing-mounted engines on the extent of laminar flow because it is typical of the size and configuration of airplanes currently being considered for laminar flow applications. However, the leading edge sweep of 28 deg precludes any significant run of NLF at typical transport flight conditions. A number of possibilities were considered for obtaining laminar flow over a limited area of the 757 wing. An approach involving suction through holes or slots in the surface to stabilize the boundary layer would make it possible to achieve extensive laminar flow; however, such an approach would be more expensive. These considerations suggested that an NLF glove be installed on the 757-200 wing in the vicinity of the engines with the leading-edge sweep angle of the glove significantly less than that of the wing. Implementation of the NLF glove and measurement of aerodynamic and acoustic data in flight on the 757 are the subject of this report.

Volume I of this report contains the program description and data analysis. Volume II is a compilation of all of the flight test data.

3.0 SYMBOLS AND ABBREVIATIONS

3.1 ACRONYMS

C-F	Crossflow
CIR	Circle
HLFC	Hybrid laminar flow control
LE	Leading edge
LFC	Laminar flow control
NLF	Natural laminar flow
OASPL	Overall sound pressure level
SPL	Sound pressure level = 20 log $\dfrac{P_{rms}}{0.0002 \text{ dynes/cm}^2}$
STR	Straight
T-S	Tollmien-Schlichting
WBL	Wing buttock line

3.2 MATHEMATICAL SYMBOLS

A	Disturbance amplitude
A_o	Disturbance amplitude at neutral stability point
c	Chord
C_L	Airplane lift coefficient
C_p	Pressure coefficient
h	Indicated double wave amplitude measured with waviness gage
$\ell nA/A_o$	Disturbance amplification factor
M	Mach number
M_{AP}	Airplane Mach number
M_{FAN}	Fan jet exhaust Mach number
N	Disturbance amplification factor (N-factor)
N_1	Engine fan r/min
N_{1C}	N_1 corrected to standard day temperature (59°F)
N_{CF}	Crossflow amplification factor
N_{TS}	Tollmien-Schlichting amplification factor
P	Pressure
P_{40}	Reference pressure — ambient pressure at 40,000 ft altitude on standard day
Re_C	Reynolds number based on chord
$Re_{\Theta_{AL}}$	Reynolds number based on momentum thickness and velocity at attachment line
s	Arc length along surface from leading edge
s/c	Normalized arc length along surface from leading edge
x	Distance from leading edge along airfoil chord

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x/c	Normalized distance from leading edge along airfoil chord
y/δ	Distance above glove surface normalized by boundary layer thickness
z	Airfoil ordinate
α	Airplane angle of attack
β	Airplane sideslip angle (positive nose left)
δ	Boundary layer thickness
γ	Ratio of specific heats
Λ	Sweep angle
ψ	Angle of disturbance wavenumber vector with respect to local potential flow velocity direction
ϱ	Density
ω^*	Dimensional disturbance frequency

3.3 SUBSCRIPTS

amb	Ambient
E2	Engine No. 2 (on glove side)
max	Maximum
tr	Transition
∞	Undisturbed reference condition

4.0 FLIGHT TEST PROCEDURE

The 757 Noise Survey and Glove Flight Test program was directed toward the acquisition of noise data covering both upper and lower surfaces of the wing. Direct measurements of transition location were also taken to determine the effect of engine noise on the extent of laminar flow on the NLF glove.

The test vehicle was the Boeing model 757-200 airplane NA001 powered by two P&W 2037 engines. The NLF glove was installed on the right-hand wing near the wing leading edge just outboard of the No. 2 engine. Pressure belts with a total of 26 ports, 20 hot-film probes, 5 surface-mounted microphones, and 2 probe-mounted microphones were installed on the NLF glove. Ten additional microphones, four surface-mounted and six probe-mounted, were on the wing outside the NLF glove region. Details of the instrumentation arrangement in all cases are provided in Chapter 6.0 of Volume I. For these tests, slat No. 4 was deactivated and slat No. 7 removed. All remaining slat segments were fully operable.

The tests during which extensive noise and aerodynamic data were obtained were conducted on four separate flights on June 3, 10, 24, and 26, 1985, from King County International Airport, Seattle, Washington. The first two flights were used to complete the initially planned series for which a complete set of noise, static pressure, and transition data were acquired. The last two flights provided data for a more detailed evaluation of the aerodynamic characteristics of the NLF glove. Static pressures in the outboard portion of the glove were obtained as well as expanded coverage of the transition phenomena by relocation of the hot-film gages. No noise data were taken during these latter flights.

The airplane instrumentation systems were activated as follows:

High speed pulse code modulation (HSPCM) — On airborne data analysis and monitoring system (ADAMS)

- Operable BA, GW, FC, and PC programs (see below)

Manual notes

- Condition time
- Gross weight and center of gravity
- Altitude
- Mach number
- Stabilizer setting
- Total air temperature
- Engine r/min and exhaust gas temperature

The specific codes of the ADAMS system are defined as follows:

BA — Basic airplane data

GW — Gross weight data

FC — Flight control data

PC — Pressure coefficient data

The test procedure followed a generally accepted approach for this type of testing. The airplane was stabilized at the specified Mach number and altitude, which was held constant for most conditions. In several cases where engine power conditions were insufficient to maintain altitude, low descent rates were permitted and the average altitude for the data recording period were listed. Engine thrust setting and airplane trim were set and held constant while on condition. The condition period was defined to provide 1 min of data acquisition while airplane flight and atmospheric conditions were stabilized.

The actual conditions flown were selected to be compatible with the preliminary plan outlined in Chapter 4.0 of Volume I, which covers the main requirements for the acquisition of data to achieve the program objectives. Additional conditions were provided as appropriate to permit evaluation of

instrumentation characteristics, atmospheric conditions, and other issues not originally anticipated. A brief summary of the four flights and the test conditions follows.

1st Flight (Flight 58-2): This flight was conducted on June 3, 1985. Aerodynamic and noise data were obtained. The flight was cut short after recording data for 13 test conditions because of widespread cirrus clouds at test altitudes. A glove cover was used during takeoff and climb to protect the glove from insects and was jettisoned at altitude.

2nd Flight (Flight 58-3): This flight was conducted on June 10, 1985. Aerodynamic and noise data were obtained for 49 test conditions. A glove cover was used during takeoff and climb, as in Flight 1.

3rd Flight (Flight 58-11): This flight was conducted on June 24, 1985. Aerodynamic data were obtained for 40 test conditions with the hot films rearranged to define the spanwise variation of transition location and with strip-a-tube installed in the outboard region of the glove. No noise measurements were made on this flight. A glove cover was used during takeoff and climb, as in Flights 1 and 2.

4th Flight (Flight 58-12): This flight was conducted on June 26, 1985 and was primarily a repeat of the conditions of Flight 3 to obtain pressure data. A problem with the reference pressure on Flight 3 at the high-altitude conditions invalidated those measurements. Hot-film data was also taken, even though an insect-protection cover was not used on this flight. No noise measurements were made on this flight.

The flight conditions for the four flights spanned the following ranges:

Mach number	0.62 to 0.83
Altitude	25,000 to 41,000 ft
C_L	0.25 to 0.70
β (sideslip angle)	-7.1 to +6.8 deg
$N_{1_{E2}}$	1001 to 4123 r/min

Figures 4-1 and 4-2 show the Mach-altitude and Mach-C_L conditions that were tested.

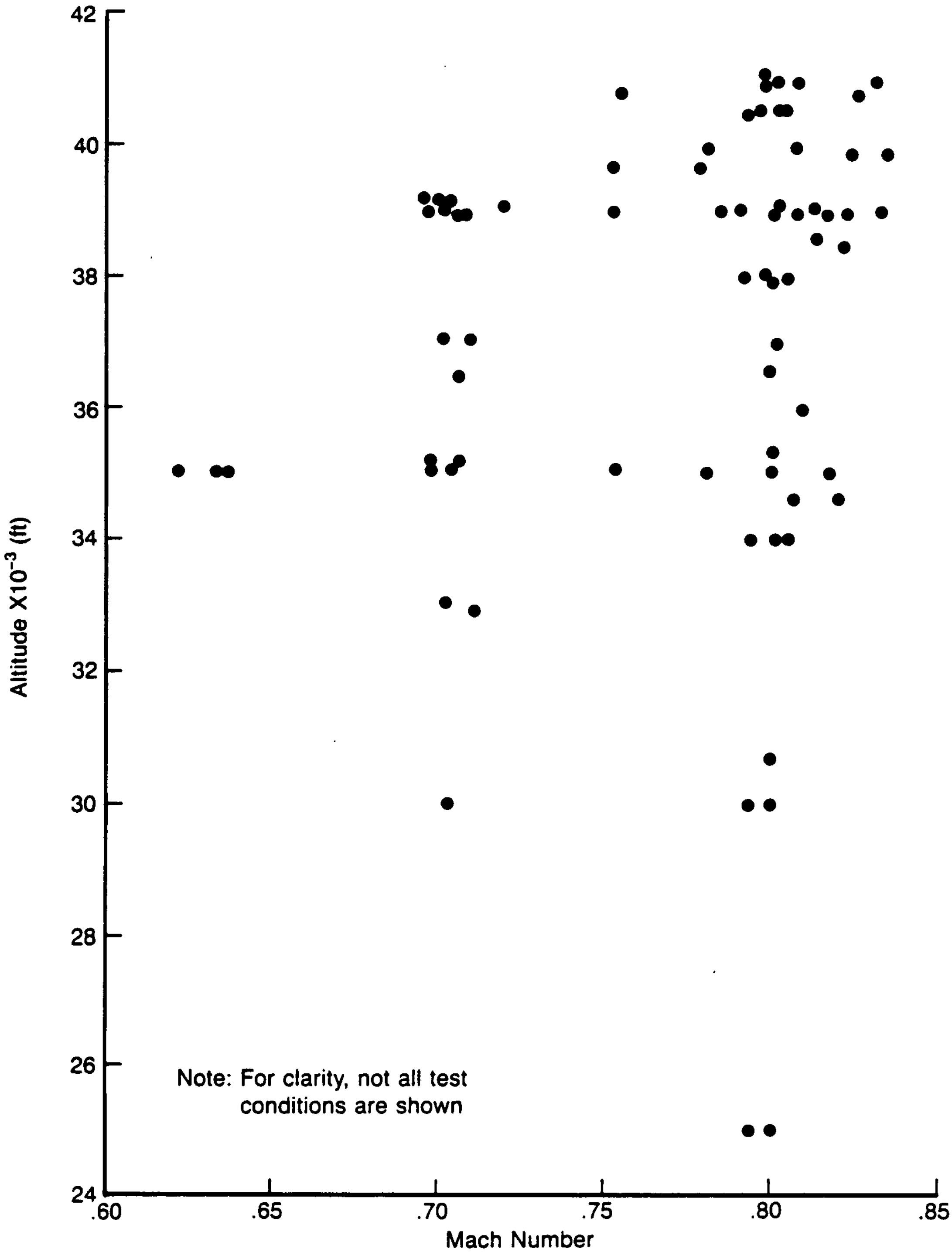


Figure 4-1. 757 NLF Glove, Mach-Altitude Conditions Tested

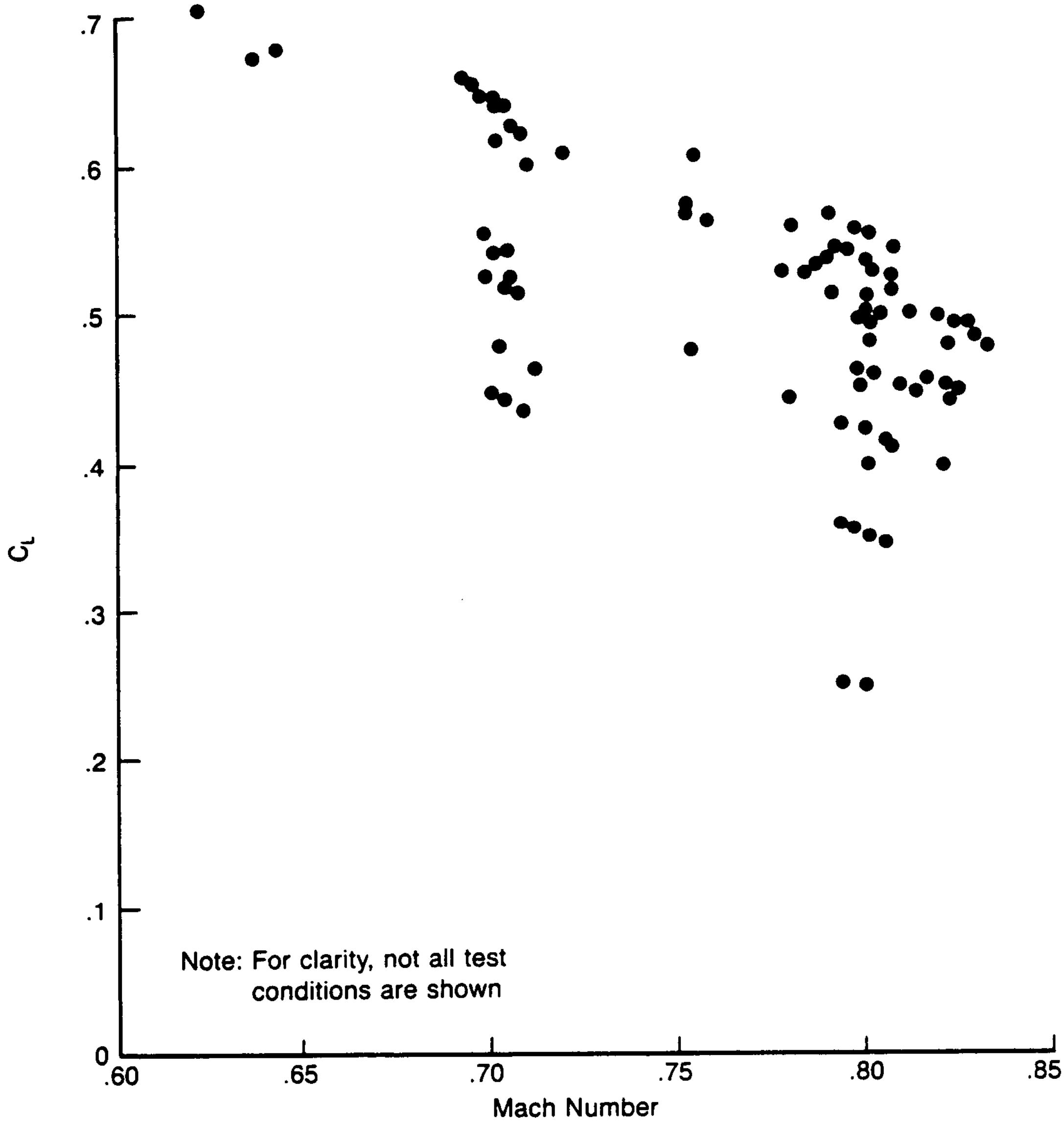


Figure 4-2. 757 NLF Glove, Mach-C_L Conditions Tested

5.0 ACOUSTIC DATA

5.1 GENERAL

This section contains a complete presentation of all of the sound-pressure fluctuation data obtained during the flight program. Microphone data were recorded only for Flights 1 and 2. The data are organized by data categories as shown in Tables 5-1 and 5-2. The categories were selected to represent logical data groups corresponding to combinations of test parameters of major interest. Other categories were chosen on the basis of presentation convenience or for ease of comparison. Tables 5-3 and 5-4 are listings of selected airplane and engine test parameters derived from data measured during noise recording sequences for Flights 1 and 2. Continuous data recordings for each condition were averaged over approximately 1 min while the airplane was on condition. Engine 1 refers to the left-wing engine and Engine 2 to the engine on the right wing where the glove was installed. The test conditions are listed in order of measurement. For reference, the microphone layout is shown in Figure 5-1. Microphone installation specification details are shown in Table 5-5.

5.2 OASPL DATA

The OASPL data for the frequency range 45 Hz to 11.22 KHz are tabulated in Tables 5-6 and 5-7. The effect of the airplane electrical interference tone at 400 Hz has been removed from the Microphone 2 values. The OASPLs of the other microphones are not affected by more than 0.2 dB because of the electrical interference, and therefore have not been corrected.

The sensitivity calibration for Microphone 4 showed a 9.5 dB change from the pretest calibration to the post-test calibration for both Flights 1 and 2. This introduced an uncertainty into the selection of calibration factors for data processing. Based on analysis of the resulting data, which included a comparison of the Microphone 4 data with that from Microphones 8, 10, 17, it was concluded that the Microphone 4 sensitivity had changed for Flight 2 compared to Flight 1. It is estimated that the Flight 1 Microphone 4 sensitivity was 9.5 dB higher than that for Flight 2.

Examination of the data from Microphone 7 for Flight 1 reveals inconsistencies with the corresponding Flight 2 data as well. Generally the Flight 1 values are lower than those from Flight 2 for similar flight conditions. However, the calibrations for Microphone 7 all showed the same sensitivity in contrast with those of Microphone 4. The output from Microphone 7 during Flight 1 was somewhat intermittent as observed from the online oscilliscope, whereas during Flight 2 the oscilliscope signal for this microphone did not show any irregularities. Therefore, it is believed that the Flight 2 noise values from Microphone 7 are correct.

5.3 NOISE SPECTRA DATA

All of the microphone data recorded during Flights 1 and 2 were developed into one-third-octave band spectra for center frequencies from 50 Hz to 10 KHz. Plots of the resulting spectra, grouped by the categories shown in Tables 5-1 and 5-2, are contained in this chapter according to the listing provided below. Narrowband spectra for Flight 2, Categories 5 and 6, are also contained in this section and are presented immediately following the one-third-octave band spectra to which they correspond.

Flight 1

Data Category	Figures
1	5-2 through 5-10
2	5-11 through 5-19
3	5-20 through 5-28
6	5-29 through 5-37

Flight 2

Data Category		Figures
1		5-38 through 5-46
2		5-47 through 5-55
3		5-56 through 5-64
4		5-65 through 5-73
5		5-74 through 5-82
	(Narrowband)	5-83 through 5-91
6		5-92 through 5-100
	(Narrowband)	5-101 through 5-109
7		5-110 through 5-118
8		5-119 through 5-127
9		5-128 through 5-136
10		5-137 through 5-145
11		5-146 through 5-154
12a		5-155 through 5-163
12b		5-164 through 5-172

Table 5-1. One-Third-Octave Band Plot Categories—Flight Test 1

	Cond. no.	Airplane Mach no.	Altitude (10^3 ft)	Right engine N_{1C}	Sideslip, deg
Category 1, Zero sideslip	001	0.82	39	4175	0
	005	0.81	39	4010	0
	035	0.81	40	4019	0
	036	0.78	40	3908	0
	109	0.79	39	3810	0
Category 2, Positive sideslip	002	0.81	39	4353	5.4
	006.1	0.79	39	4382	5.8
	016	0.80	41	4245	6.3
Category 3, Negative sideslip	006.2	0.80	39	4348	-6.4
	017	0.80	41	4366	-7.1
Category 6, Engine power variation	013	0.80	41	4366	0
	014	0.81	41	4221	0
	015	0.81	41	4115	0

Table 5-2. One-Third-Octave Band Plot Categories—Flight Test 2

	Cond. no.	Mach no.	Altitude (10^3 ft)	Right engine N_{1C}	Sideslip, deg	
Category 1— Altitude variation— Zero sideslip	201 204 207 210 211 239 214 241	0.80 0.81 0.81 0.80 0.80 0.80 0.81 0.80	30 34 36 37 38 38 39 41	3227 3424 3585 3660 3850 3557 3954 4034	0 0 0 0 0 0 0 0	
Category 2— Positive sideslip	202 205 212	0.79 0.79 0.79	30 34 38	3240 3437 3867	3.2 3.9 3.9	
Category 3— Negative sideslip	203 206 213	0.79 0.80 0.80	30 34 38	3294 3481 3796	−4.0 −3.9 −3.7	
Category 4— Bleed valve noise check	217 218	0.71 0.70	37 37	3557 3582	0 0	
Category 5— Engine power variation $M_{AP} = 0.63$	219 220 221	0.64 0.62 0.63	35 35 35	4493 2928 2315	0 0 0	Narrowband analyzed
Category 6— Engine power variation $M_{AP} = 0.8$	223 224 225 228	0.80 0.80 0.80 0.79	40.5 40.5 40.5 41.3	4340 4102 3793 2645	0 0 0 0	Narrowband analyzed
Category 7— Engine power variation $M_{AP} = 0.7$	231 232 233 237 236 238	0.70 0.70 0.70 0.71 0.71 0.69	39 39 39 39 39 36.5	4508 4019 3631 3280 2602 1097	0 0 0 0 0 0	

Table 5-2. One-Third-Octave Band Plot Categories—Flight Test 2 (Continued)

	Cond. no.	Mach no.	Altitude (10^3 ft)	Right engine N_{1C}	Sideslip, deg	
Category 8— Engine power variation M_{AP} = 0.82	243 244 245 247	0.82 0.82 0.82 0.81	39 39 39 38.5	4345 4116 3865 2501	0 0 0 0	
Category 9— Sideslip variation M_{AP} = 0.8	224 225 226 227	0.80 0.80 0.79 0.80	40.5 40.5 40.5 40.5	4102 3793 3965 3993	0 0 4.8 -4.0	
Category 10— Sideslip variation M_{AP} = 0.7	232 233 234 235	0.70 0.70 0.70 0.71	39 39 38 39	4019 3631 3786 3816	0 0 6.8 -6.7	
Category 11— Other sideslip data	240 246	0.80 0.82	38 39	3673 4355	3.9 4.0	
Category 12— Other zero sideslip	242 249 250 251 252 229 215 216 248 222	0.83 0.78 0.75 0.76 0.75 0.75 0.82 0.83 0.82 0.81	43 39 39 39 39 40.5 39 39 39 39	4321 3717 3723 4426 4007 3330 4042 4331 4023 3903	0 0 0 0 0 0 0 0 0 0	

Table 5-3. Noise-Related Airplane and Engine Data—Flight Test 1

Cond. no.	Airplane Mach no.	Pressure altitude, ft	C_L	Sideslip, deg	N_{1C}, r/min (left eng)	N_{1C}, r/min (right eng)	N_1, r/min (right eng)	Mach no. (fan exhaust)
005	0.81	38 952	.52	–0.2	4366	4010	3644	1.23
006.1	0.79	39 008	.54	5.8	4388	4382	3971	1.28
001	0.82	38 950	.49	–0.3	4348	4175	3800	1.27
002	0.81	39 012	.50	5.4	4359	4353	3974	1.29
109	0.79	38 957	.53	–0.7	4391	3810	3461	1.17
006.2	0.80	38 926	.51	–6.4	4369	4348	3962	1.28
035	0.81	39 952	.53	–0.3	4359	4017	3633	1.23
036	0.78	39 957	.56	–0.4	4394	3908	3519	1.18
013	0.80	40 948	.55	0.2	4129	4366	3934	1.28
014	0.81	40 946	.54	0	4222	4220	3823	1.27
015	0.81	40 946	.54	–0.2	4367	4115	3733	1.25
016	0.80	41 002	.56	6.3	4383	4245	3848	1.26
017	0.80	40 878	.55	–7.1	4374	4366	3986	1.28

Compressor bleed closed for all conditions

Table 5-4. Noise-Related Airplane and Engine Data—Flight Test 2

Cond. no.	Airplane Mach no.	Pressure altitude, ft	C_L	Sideslip, deg	N_{1C}, r/min (left eng)	N_{1C}, r/min (right eng)	N_1, r/min (right eng)	Mach no. (fan exhaust)
201	0.80	30 011	.35	−0.6	4161	3227	3109	1.06o
202	0.79	30 080	.36	3.2	4174	3240	3114	1.05o
203	0.79	30 075	.36	−4.0	4179	3294	3167	1.07o
204	0.81	34 001	.42	−0.2	4300	3424	3224	1.10o
205	0.79	34 008	.43	3.9	4317	3437	3230	1.09o
206	0.80	34 000	.42	−3.9	4304	3481	3274	1.11o
207	0.81	36 000	.45	0	4359	3585	3333	1.17o
210	0.80	36 998	.48	−0.3	4376	3660	3380	1.14c
211	0.80	37 994	.50	−0.2	4361	3850	3538	1.19c
212	0.79	37 988	.51	3.9	4382	3867	3545	1.18c
213	0.80	37 927	.50	−3.7	4361	3796	3485	1.17c
214	0.81	38 987	.52	−0.1	4365	3954	3614	1.21c
215	0.82	38 988	.50	−0.1	4346	4042	3701	1.24c
216	0.83	38 986	.48	0	4331	4327	3971	1.30c
218	0.70	37 007	.62	−0.6	4437	3582	3265	1.05o
217	0.71	37 007	.60	−0.5	4350	3557	3248	1.06c
219.1	0.64	35 020	.67	0.7	2491	4493	4121	1.19c
220.1	0.62	35 009	.71	−0.8	4502	2928	2683	0.86o
221	0.63	35 007	.68	−0.6	4500	2315	2123	0.76o
222	0.81	38 991	.50	0.1	4365	3903	3571	1.20c
248	0.82	38 990	.48	0.2	4344	4023	3692	1.24c
249	0.78	38 993	.53	0	4393	3717	3391	1.14o
250	0.75	38 999	.57	0	4438	3723	3382	1.12o
251	0.76	38 997	.56	0.2	3623	4426	4023	1.26c
252	0.75	38 994	.57	−0.4	3977	4007	3638	1.19c
223	0.80	40 483	.53	−0.2	4004	4340	3934	1.28c
224	0.80	40 482	.54	−0.4	4081	4102	3714	1.24c
225	0.80	40 483	.54	−0.7	4373	3793	3437	1.18o
226	0.79	40 426	.55	4.8	4383	3965	3587	1.20c
227	0.80	40 449	.54	−4.0	4373	3993	3617	1.21c
228	0.79	41 296	.57	−0.5	4395	2645	2384	0.94o
229	0.75	40 793	.61	−0.4	4442	3330	2994	1.04o
231	0.70	39 015	.64	0.7	3575	4508	4059	1.23c
232	0.70	39 008	.65	0	3993	4019	3618	1.15c
233	0.70	39 005	.65	−0.3	4518	3631	3270	1.06o
234	0.70	39 042	.64	6.8	4512	3786	3412	1.09c
235	0.71	38 954	.62	−6.7	4505	3816	3443	1.11c
236	0.71	38 920	.63	−0.8	4510	2602	2349	0.85o
237	0.71	39 005	.62	−0.5	4506	3280	2962	0.99o
239	0.80	38 000	.46	−0.5	4376	3557	3271	1.12o
240	0.80	38 003	.46	3.9	4382	3673	3377	1.14o
241	0.80	40 971	.53	0	4373	4034	3653	1.23c
242	0.83	40 968	.49	0.3	4338	4321	3930	1.30c
243	0.82	38 976	.46	0.2	3700	4345	3985	1.29c
244	0.82	38 972	.45	−0.3	4085	4116	3776	1.26c
245	0.82	38 974	.45	−0.3	4351	3865	3542	1.20c
246	0.82	38 989	.46	4.0	3895	4355	3987	1.29c
247	0.81	38 548	.45	−0.7	4364	2501	2293	0.93o
238	0.69	36 497	.53	−0.7	4501	1097	1001	0.70o

o — Bleed vave open c — Bleed valve closed

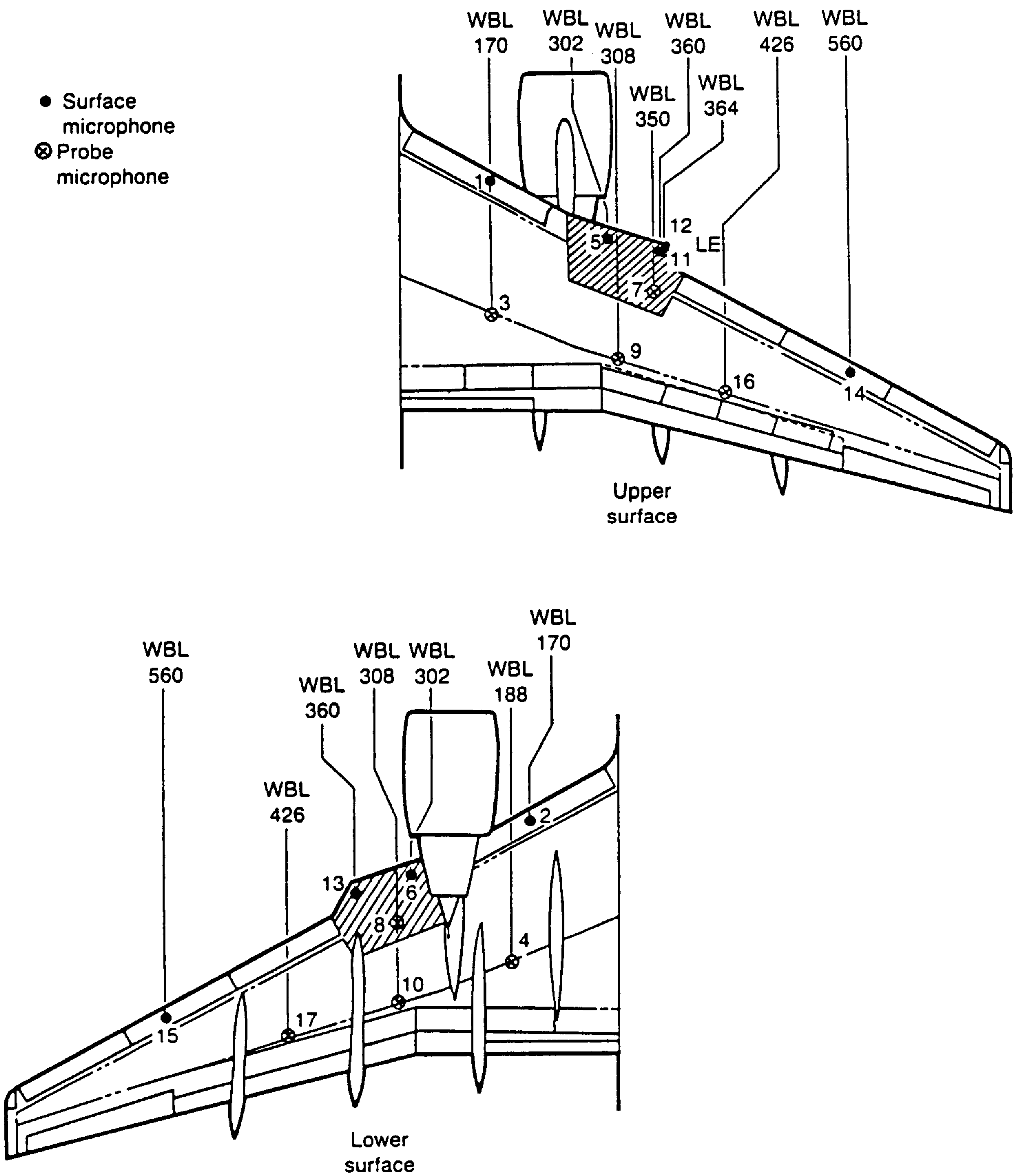


Figure 5-1. Microphone Locations

Table 5-5. Microphone Installation Details

Microphone no.	WBL	Wing surface	Nominal chord, x/c	Approximate distance from leading edge, in	Type	Probe height, in	Probe angle, deg
1	170	Upper	0.05	8	Surface		
2	170	Lower	0.05	8	Surface		
3	170	Upper	0.6	156	Probe	5	6
4	188	Lower	0.6	156	Probe	4	0
5	302	Upper glove	0.05	11.9	Surface		
6	302	Lower glove	0.05	11.7	Surface		
7	350	Upper glove	0.3	63.4	Probe	1.5	7
8	308	Lower glove	0.3	62.7	Probe	1.5	3
9	308	Upper	0.6	141	Probe	4	5
10	308	Lower	0.6	141	Probe	3	1
11	360	Upper glove	0.05	11.4	Surface		
12	364	Leading edge	0	0	Surface		
13	360	Lower glove	0.05	11.2	Surface		
14	560	Upper	0.05	8	Surface		
15	560	Lower	0.05	8	Surface		
16	426	Upper	0.6	109	Probe	3	6
17	426	Lower	0.6	109	Probe	2	1.5

Table 5-6. Overall Sound Pressure Levels—Flight 1

	Microphone Number								
Cond	1	2	3	4	5	6	7	8	9
001	128.89	119.20	125.04	131.41	124.70	130.21	111.90	137.74	125.61
002	128.56	119.60	129.75	131.32	123.58	130.31	109.94	137.23	131.86
005	128.70	119.50	128.74	128.94	123.83	129.31	109.01	136.19	125.88
6.1	128.39	119.40	128.46	130.64	125.76	130.09	109.22	135.00	135.38
6.2	128.05	119.10	129.81	131.59	125.15	133.67	127.48	138.01	122.43
013	127.70	117.70	127.19	130.15	123.12	129.33	108.26	135.51	126.05
014	127.71	118.50	128.25	129.78	123.49	129.25	108.63	135.20	125.74
015	127.69	118.10	128.38	129.08	123.65	128.88	107.56	134.92	125.20
016	127.42	118.20	130.58	129.62	123.30	128.43	107.75	134.03	137.32
017	126.81	117.60	132.65	130.32	124.04	132.73	125.41	137.00	123.81
035	128.25	*	128.39	128.65	124.48	129.31	108.48	135.73	125.99
036	127.80	*	126.26	126.78	127.55	128.96	112.20	133.63	130.38
109	128.41	118.80	126.60	126.68	123.97	127.78	108.35	134.07	129.63

	Microphone Number							
Cond	10	11	12	13	14	15	16	17
001	131.18	126.94	115.74	129.79	111.76	121.51	108.42	127.40
002	132.47	130.98	116.76	127.19	108.62	119.44	139.16	128.40
005	128.02	126.93	117.06	131.11	111.99	120.63	126.10	124.42
6.1	131.04	133.13	117.85	134.30	113.72	118.41	134.91	126.14
6.2	132.11	126.40	120.80	130.80	115.22	124.17	130.53	129.50
013	130.36	127.42	*	133.21	109.40	120.35	126.79	126.17
014	129.15	130.39	*	134.41	111.85	120.76	130.62	125.25
015	128.20	130.11	*	134.54	109.75	120.58	128.17	124.17
016	128.99	124.39	*	124.84	108.13	116.79	136.63	124.46
017	130.80	126.22	*	133.16	113.36	122.30	139.36	127.86
035	127.79	128.81	*	134.25	112.54	121.41	126.37	124.13
036	125.18	130.79	*	135.22	113.58	121.81	119.95	121.17
109	125.02	124.60	118.50	131.73	111.16	120.39	119.31	121.43

*No data, microphone malfunction

Table 5-7. Overall Sound Pressure Levels—Flight 2

	Microphone Number								
Cond	1	2	3	4	5	6	7	8	9
201	131.40	125.20	131.29	135.49	132.27	131.82	125.48	134.97	125.41
202	131.29	124.90	130.22	135.07	130.98	129.07	122.62	133.17	129.94
203	131.26	125.00	131.79	135.80	130.00	133.66	122.74	136.50	126.12
204	130.12	123.40	129.99	135.27	129.75	134.48	124.37	135.74	127.57
205	129.97	123.70	129.77	134.44	127.71	128.48	123.74	133.15	132.62
206	130.02	123.20	130.84	135.61	135.69	135.38	124.44	136.99	123.45
207	129.63	122.60	129.67	135.48	128.88	129.70	123.25	136.11	125.72
210	129.11	121.80	129.43	126.27	127.06	128.93	118.94	135.15	127.16
211	128.47	121.40	129.17	117.50	126.62	129.43	116.64	135.35	126.90
212	128.10	120.90	128.98	127.02	124.36	128.60	118.46	134.10	132.29
213	127.77	120.50	131.09	127.24	126.63	130.30	124.92	135.86	124.20
214	127.37	120.90	129.61	127.74	126.41	129.51	115.58	135.80	126.57
215	127.65	120.90	124.48	129.42	127.45	130.32	116.23	136.47	126.08
216	127.81	121.20	122.26	131.42	127.70	132.44	118.23	138.93	115.53
217	126.67	117.00	126.85	120.14	123.44	125.15	128.74	125.24	118.17
218	126.52	119.60	128.09	132.75	123.66	126.05	130.00	127.55	118.09
219	127.10	120.70	128.31	128.44	131.33	131.78	126.40	133.08	119.07
220	126.78	123.50	127.66	130.34	131.02	123.74	125.54	121.52	118.25
221	126.86	121.50	128.23	125.88	130.93	119.12	124.58	116.58	118.62
222	127.31	120.70	129.29	127.48	125.70	129.47	117.11	135.55	126.14
223	126.57	120.00	128.43	130.14	128.77	131.86	115.19	136.07	127.22
224	126.30	119.50	127.85	128.39	125.11	129.46	115.53	135.49	128.51
225	126.28	120.00	127.88	134.29	124.66	127.42	114.87	134.41	127.54
226	126.24	119.60	127.12	126.79	121.56	127.44	110.06	133.51	130.66
227	126.02	119.10	129.66	127.50	124.92	129.51	121.86	135.81	126.10
228	125.68	118.10	130.43	125.81	123.82	120.40	116.15	120.92	129.65
229	125.14	117.30	128.41	129.80	120.61	122.42	120.91	124.82	119.61
231	125.25	117.10	127.02	128.08	125.04	130.05	127.21	133.17	117.58
232	125.10	117.00	129.02	124.74	124.32	127.90	128.05	130.71	117.48
233	125.08	118.70	129.20	132.19	123.08	125.03	128.36	126.80	117.30
234	125.32	116.00	124.20	121.38	123.88	125.15	120.79	125.98	121.69
235	124.63	117.40	130.70	123.31	125.90	127.74	130.65	130.36	121.15
236	125.20	117.50	128.20	126.54	121.24	120.46	128.35	118.50	117.18
237	125.28	118.20	127.49	130.53	121.26	123.07	127.57	124.36	117.28
238	126.78	121.30	128.56	114.71	133.29	130.46	128.63	121.39	118.42
239	127.73	121.90	127.71	134.09	126.82	127.72	122.65	134.44	126.99
240	127.73	121.90	128.46	124.97	124.55	127.80	121.55	134.26	128.46
241	126.20	119.60	127.60	127.61	124.15	128.56	115.90	135.18	125.52
242	126.65	119.90	121.19	130.42	113.35	129.74	115.71	138.00	114.35
243	127.58	120.70	125.02	131.56	126.62	131.32	119.95	138.50	124.17
244	127.74	121.00	125.03	130.27	126.68	132.21	122.57	137.16	123.75
245	127.76	121.10	125.61	127.96	127.35	132.77	122.65	137.41	123.84
246	127.63	120.30	126.05	131.04	127.07	131.61	121.25	137.62	129.90
247	127.79	121.30	127.80	126.36	127.22	130.26	123.38	124.15	123.20
248	127.56	120.90	123.94	129.35	126.69	130.12	116.77	136.58	125.34
249	126.93	120.30	130.56	134.59	124.77	127.84	121.23	133.71	128.72
250	126.27	118.70	127.38	131.16	122.85	127.36	122.25	130.93	120.98
251	126.37	118.80	127.12	129.52	123.25	130.65	121.46	134.80	122.09
252	126.28	118.10	127.35	126.73	123.49	128.89	122.20	133.76	121.04

Table 5-7. *Overall Sound Pressure Levels—Flight 2 (concluded)*

	Microphone Number							
Cond	10	11	12	13	14	15	16	17
201	125.37	123.15	115.13	131.33	122.73	123.90	126.08	124.36
202	124.36	123.44	114.32	129.34	118.49	121.91	130.01	123.47
203	126.30	123.05	116.98	132.06	128.79	125.97	125.48	125.30
204	125.75	122.12	115.40	129.84	114.24	122.51	123.38	123.88
205	124.18	130.08	114.64	128.75	111.65	120.15	130.41	122.59
206	126.84	124.85	121.75	132.42	134.72	126.34	125.16	124.81
207	126.74	128.69	115.75	128.90	112.39	121.89	124.63	124.11
210	124.95	122.90	115.64	129.27	112.71	121.42	123.28	122.11
211	126.25	120.74	115.80	129.07	111.64	121.45	125.83	123.18
212	125.81	132.35	113.15	137.27	108.75	119.91	130.76	122.31
213	126.29	122.36	117.28	128.01	115.83	124.54	121.49	123.27
214	126.96	128.48	116.14	130.62	112.04	121.80	127.10	123.50
215	129.02	130.34	115.33	129.29	112.92	122.01	109.23	125.55
216	131.82	124.59	115.66	130.50	113.21	123.25	108.96	129.02
217	119.38	129.40	116.12	122.95	109.57	117.19	119.96	116.20
218	121.85	128.77	114.29	127.21	110.06	116.06	119.38	117.92
219	128.63	133.69	117.42	126.43	113.31	118.28	118.19	121.83
220	117.59	130.96	117.41	118.41	116.67	115.59	121.79	114.46
221	114.76	129.81	115.01	117.91	112.81	113.80	122.14	112.88
222	126.47	130.67	115.64	131.05	110.64	121.18	126.84	123.22
223	130.73	131.17	117.76	137.48	115.67	123.78	127.10	126.74
224	127.84	130.83	116.21	134.51	110.98	122.54	128.14	123.99
225	126.42	128.54	115.38	131.98	109.93	120.93	128.07	122.79
226	126.12	125.67	113.55	125.26	107.71	116.94	133.69	122.22
227	127.05	124.03	117.01	127.02	111.10	122.82	120.14	123.69
228	117.26	128.39	110.17	130.77	107.23	118.98	130.34	116.78
229	119.68	125.29	117.31	123.07	109.18	116.27	125.30	116.81
231	128.35	125.61	114.22	125.02	111.11	116.67	120.79	122.42
232	124.40	124.97	114.28	123.24	111.04	115.02	123.50	118.55
233	121.65	123.02	111.13	120.00	110.96	114.96	122.32	117.10
234	121.19	110.06	113.17	119.13	112.34	113.04	127.28	116.10
235	122.61	127.78	118.20	127.69	118.88	116.29	130.99	118.51
236	115.57	123.99	112.75	118.24	110.37	113.96	121.28	114.07
237	119.50	125.11	112.44	120.19	110.33	114.17	121.72	116.20
238	119.28	127.55	117.49	120.22	109.72	115.72	121.00	114.86
239	125.10	122.93	114.81	129.63	110.09	120.54	121.28	122.58
240	125.55	130.67	114.39	128.21	108.11	118.67	130.14	122.50
241	127.18	131.25	115.15	129.32	108.09	120.58	127.07	123.38
242	131.05	126.30	114.73	131.62	113.15	121.79	112.27	128.18
243	131.88	127.14	116.00	131.21	112.97	122.90	123.88	128.55
244	129.99	121.76	114.78	130.70	112.52	122.27	112.96	126.33
245	127.63	124.16	114.44	129.62	113.67	121.76	112.96	124.54
246	132.57	134.48	115.51	137.07	114.39	121.66	112.82	128.45
247	119.73	122.61	110.30	125.84	113.39	120.33	123.69	119.28
248	128.88	131.20	115.06	128.98	113.04	121.75	110.91	125.51
249	125.48	125.19	114.03	130.38	108.16	120.37	123.69	121.92
250	123.15	128.46	117.79	129.56	108.65	118.47	125.31	119.19
251	129.06	126.91	117.33	127.86	108.40	121.43	126.01	124.33
252	125.73	124.87	117.51	129.30	108.36	119.67	125.27	121.10

Table 5-8. Flight 1, Category 1, Zero Sideslip

Figures 5-2 through 5-10 present the one-third-octave band acoustic data for each microphone in Category 1 from Flight 1. Pertinent data corresponding to the Category 1, Flight 1 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
001	.82	39	4175	1.27	0
005	.81	39	4010	1.23	0
035	.81	40	4017	1.23	0
036	.78	40	3908	1.18	0
109	.79	39	3810	1.17	0

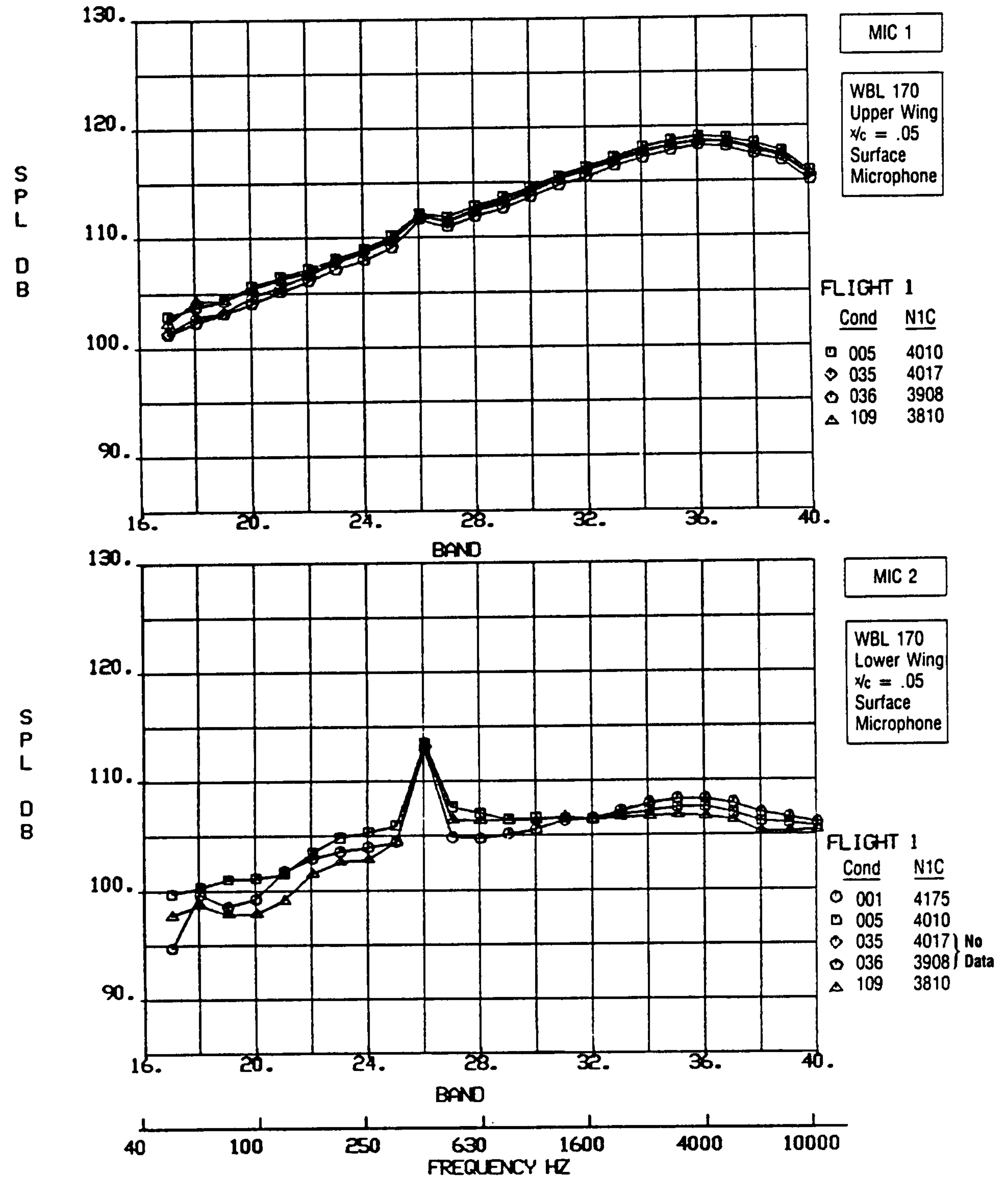


Figure 5-2. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

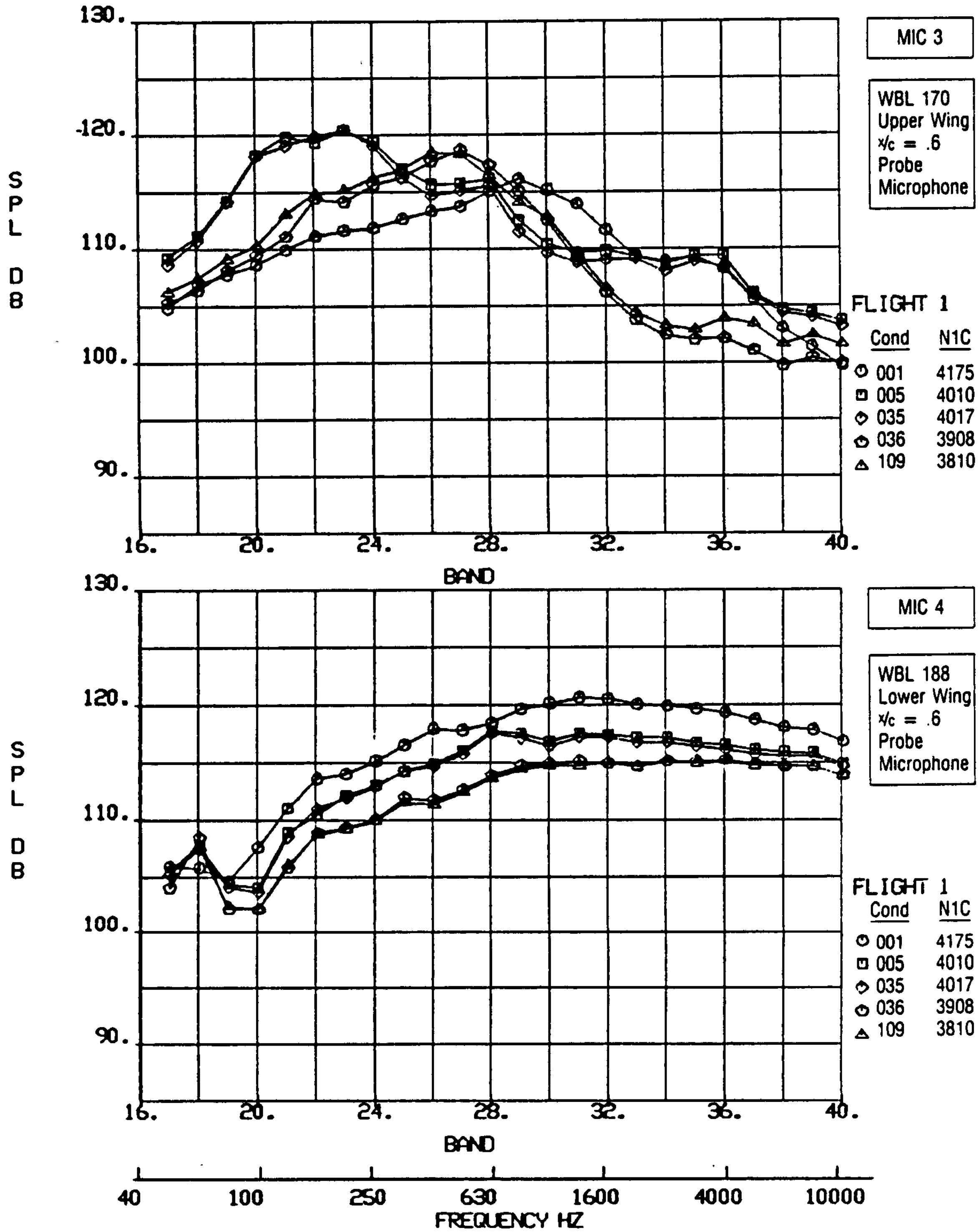


Figure 5-3. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

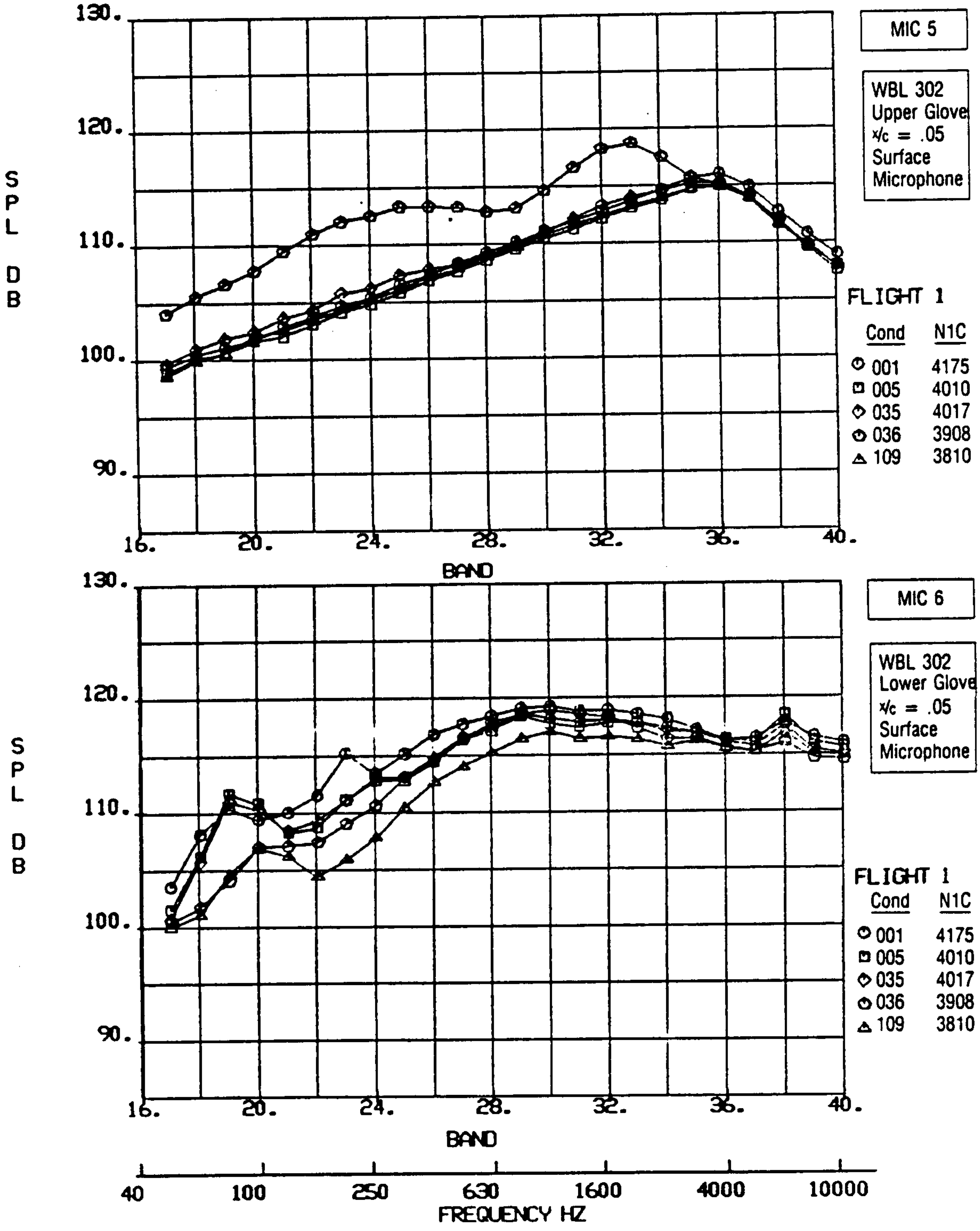


Figure 5-4. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

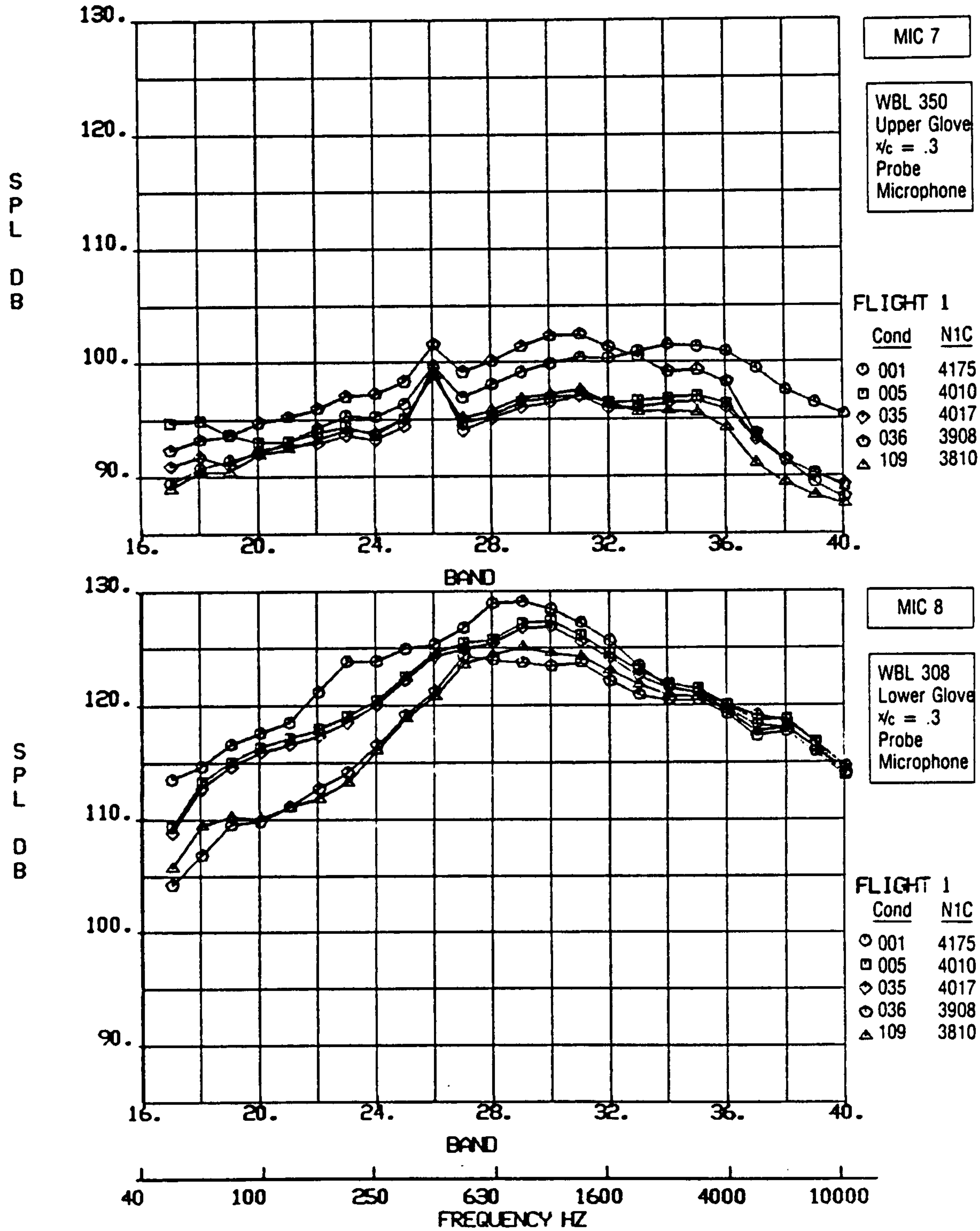


Figure 5-5. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

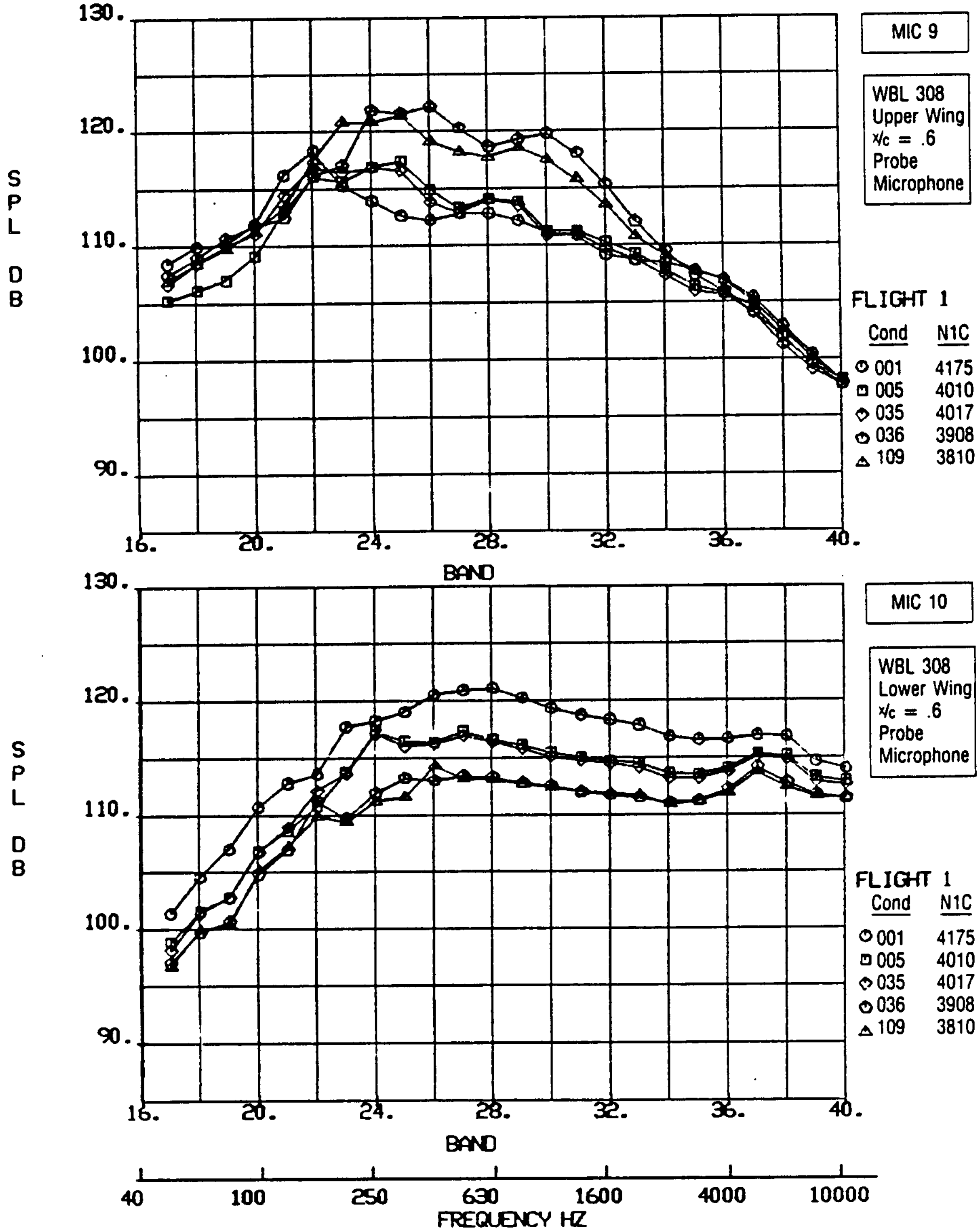


Figure 5-6. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

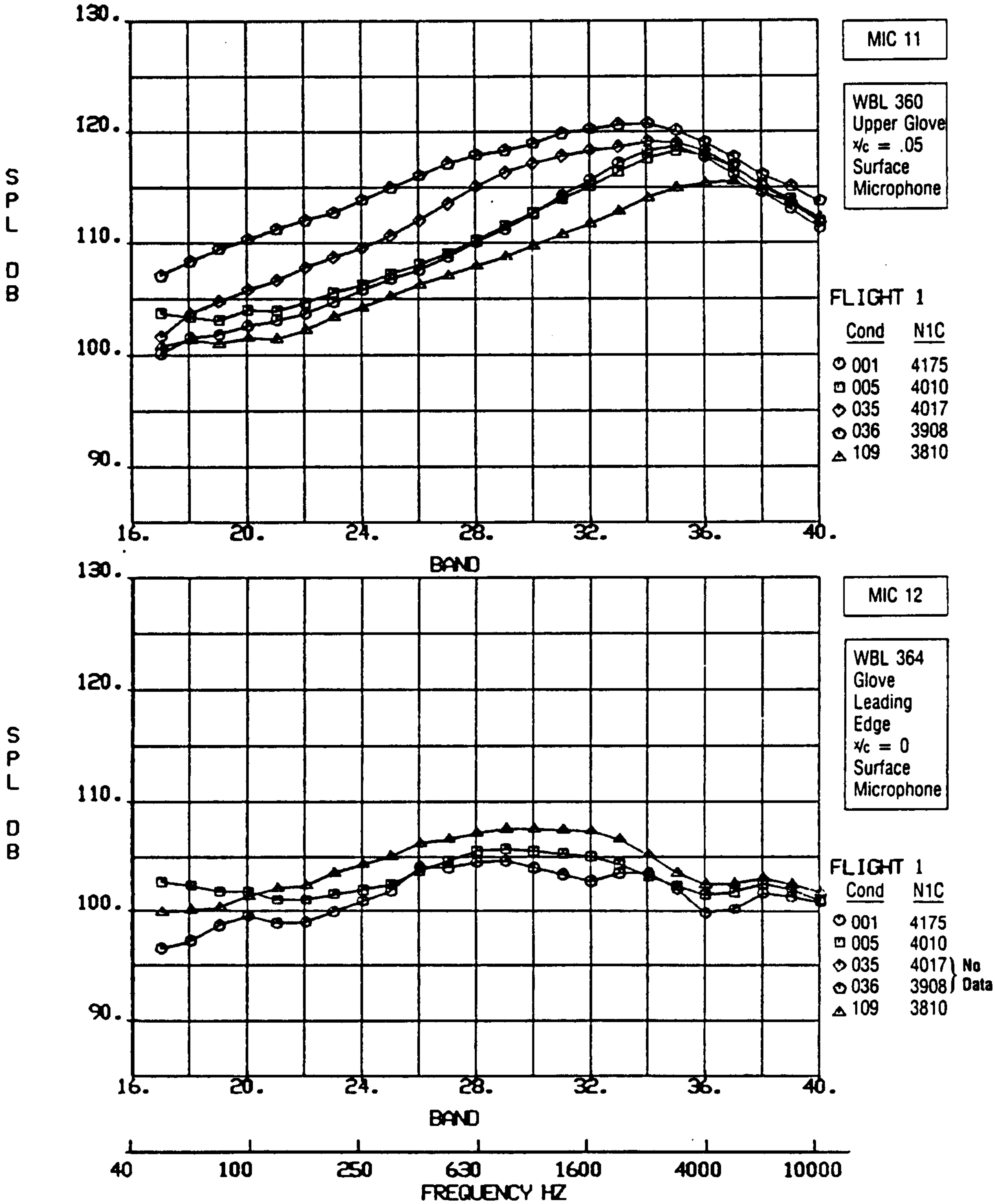


Figure 5-7. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

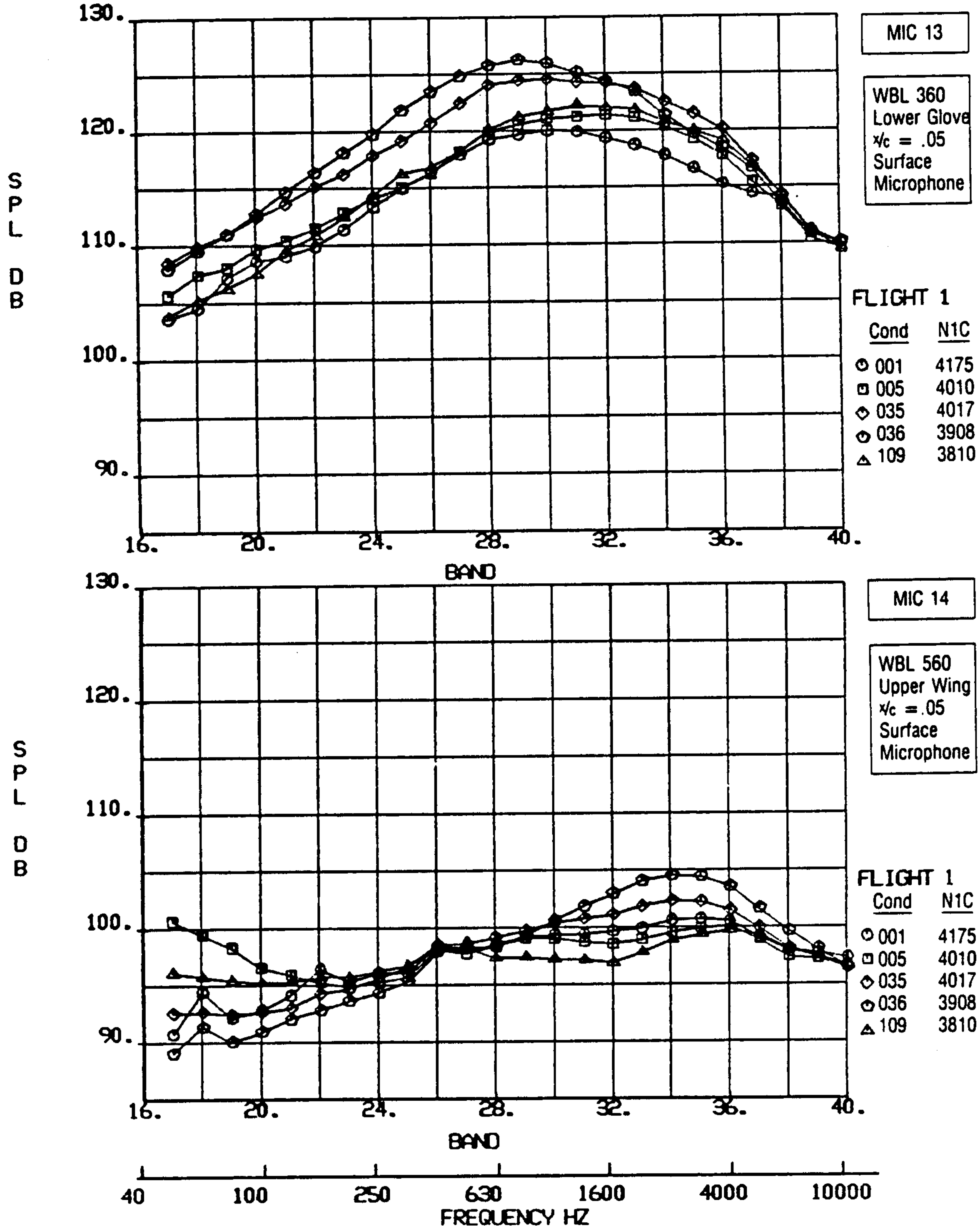


Figure 5-8. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

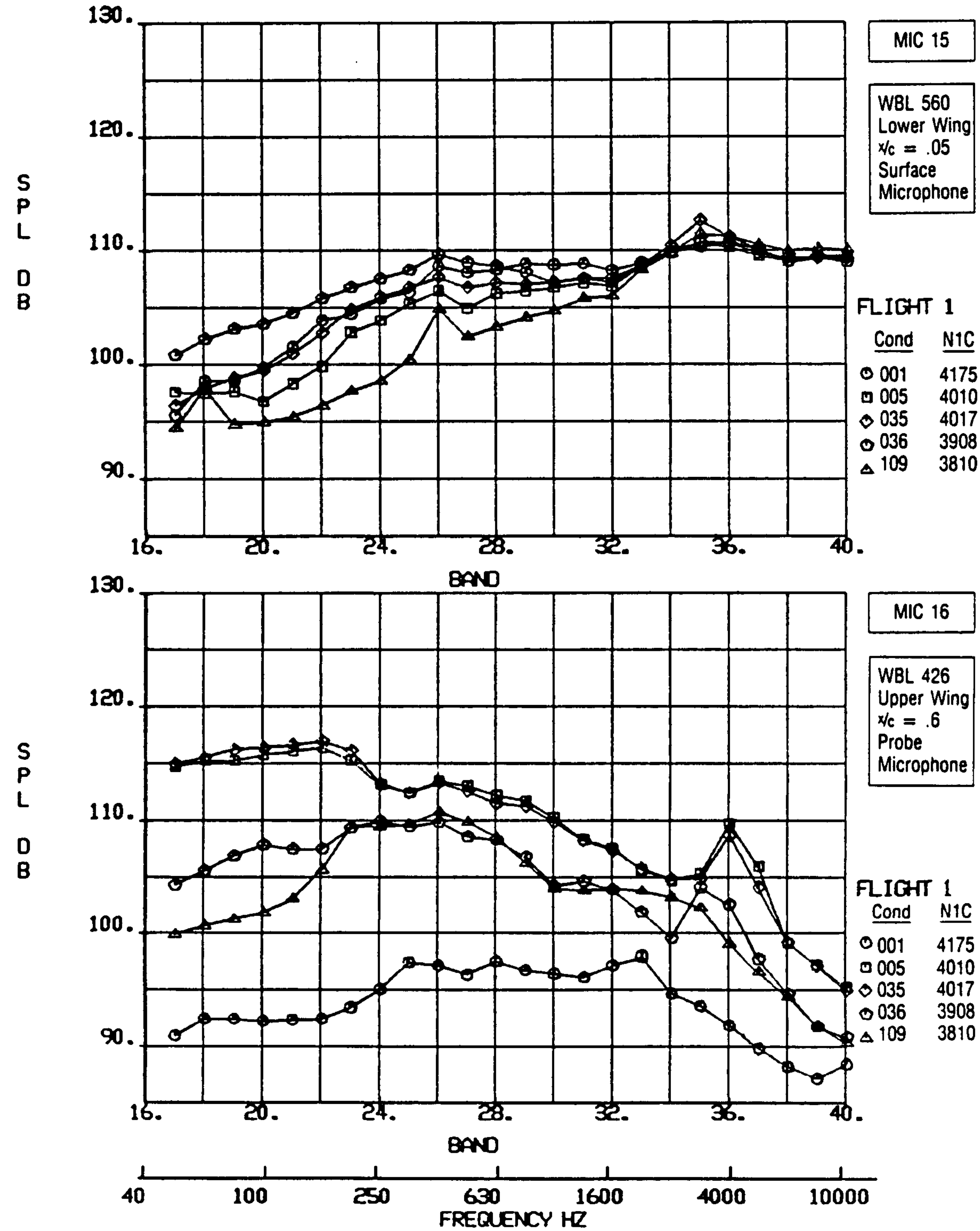


Figure 5-9. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

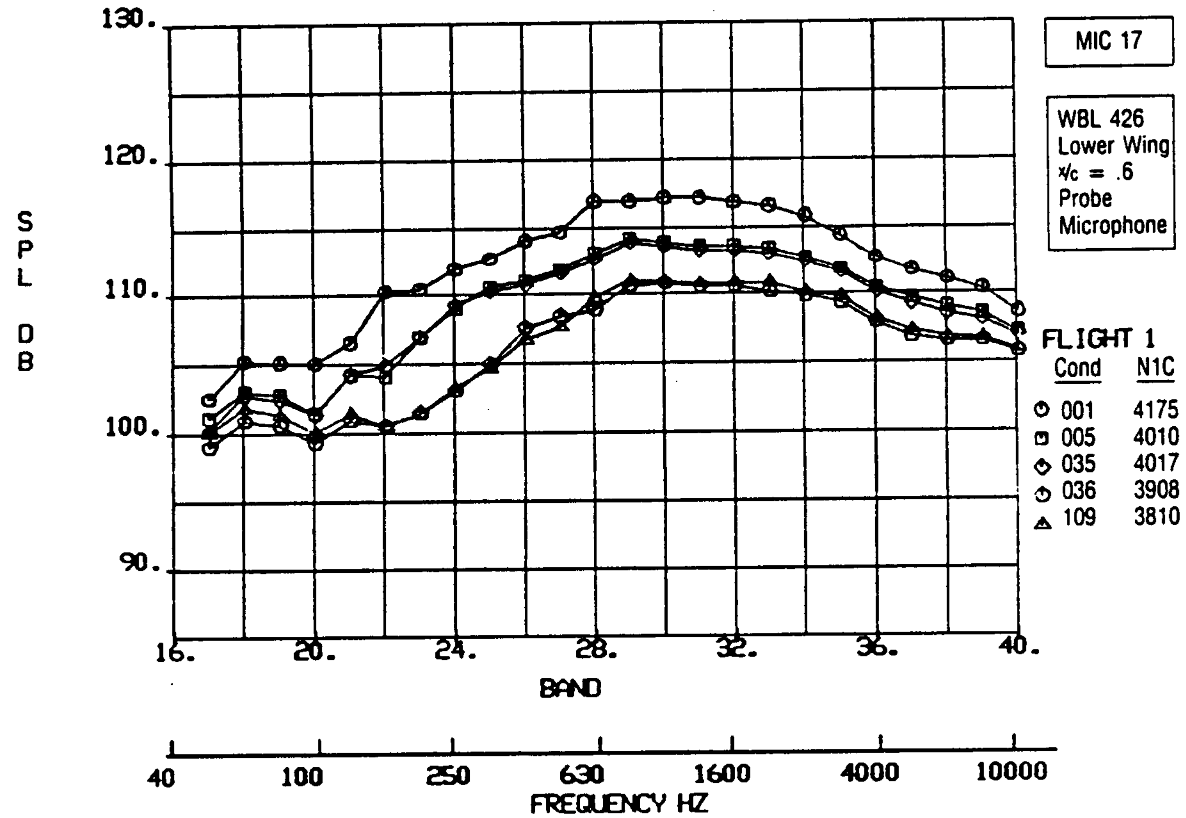


Figure 5-10. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 1, Zero Sideslip

Table 5-9. Flight 1, Category 2, Positive Sideslip

Figures 5-11 through 5-19 present the one-third-octave band acoustic data for each microphone in Category 2 from Flight 1. Pertinent data corresponding to the Category 2, Flight 1 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
002	.81	39	4353	1.29	5.4
006.1	.79	39	4382	1.28	5.8
016	.80	41	4245	1.26	6.3

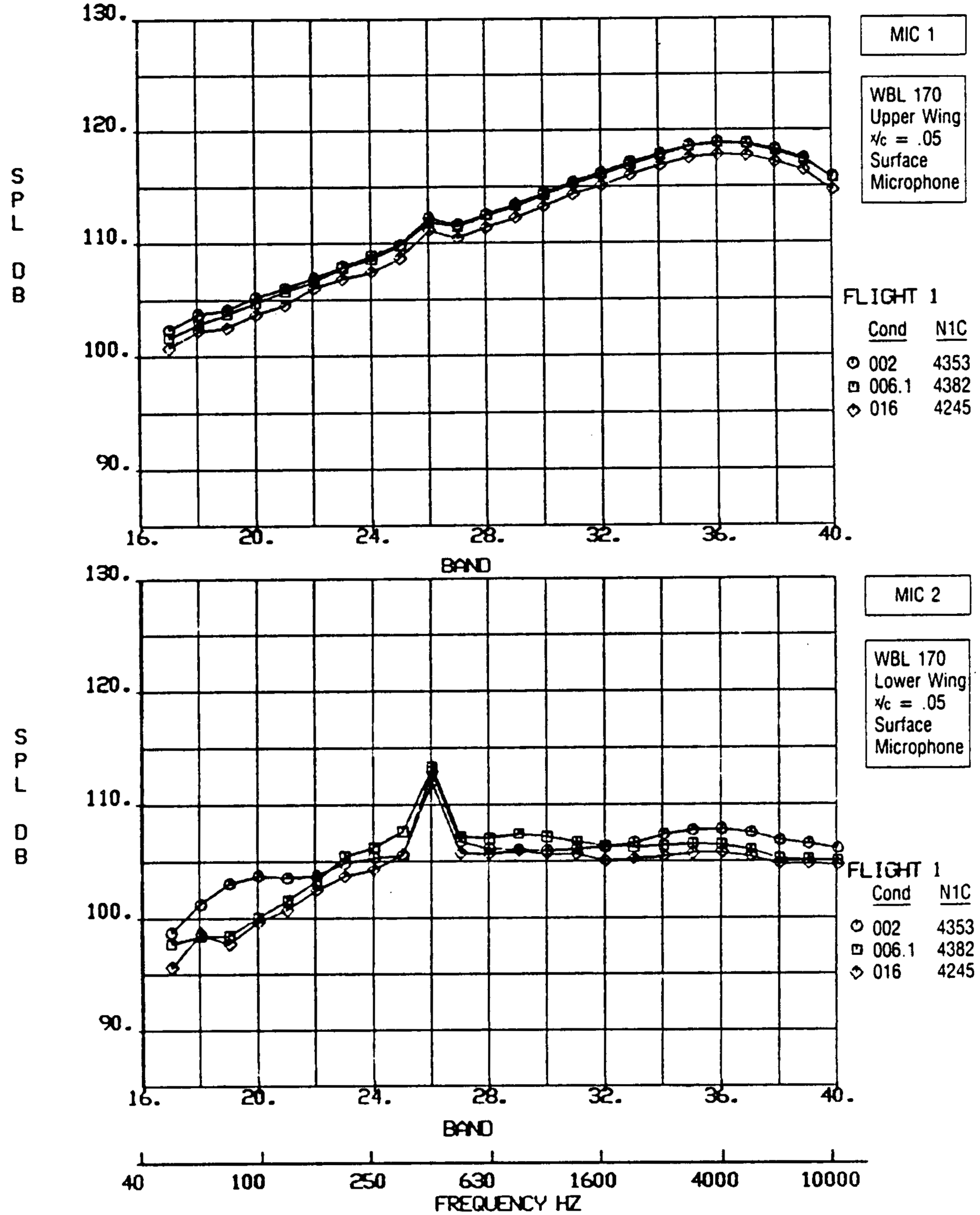


Figure 5-11. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

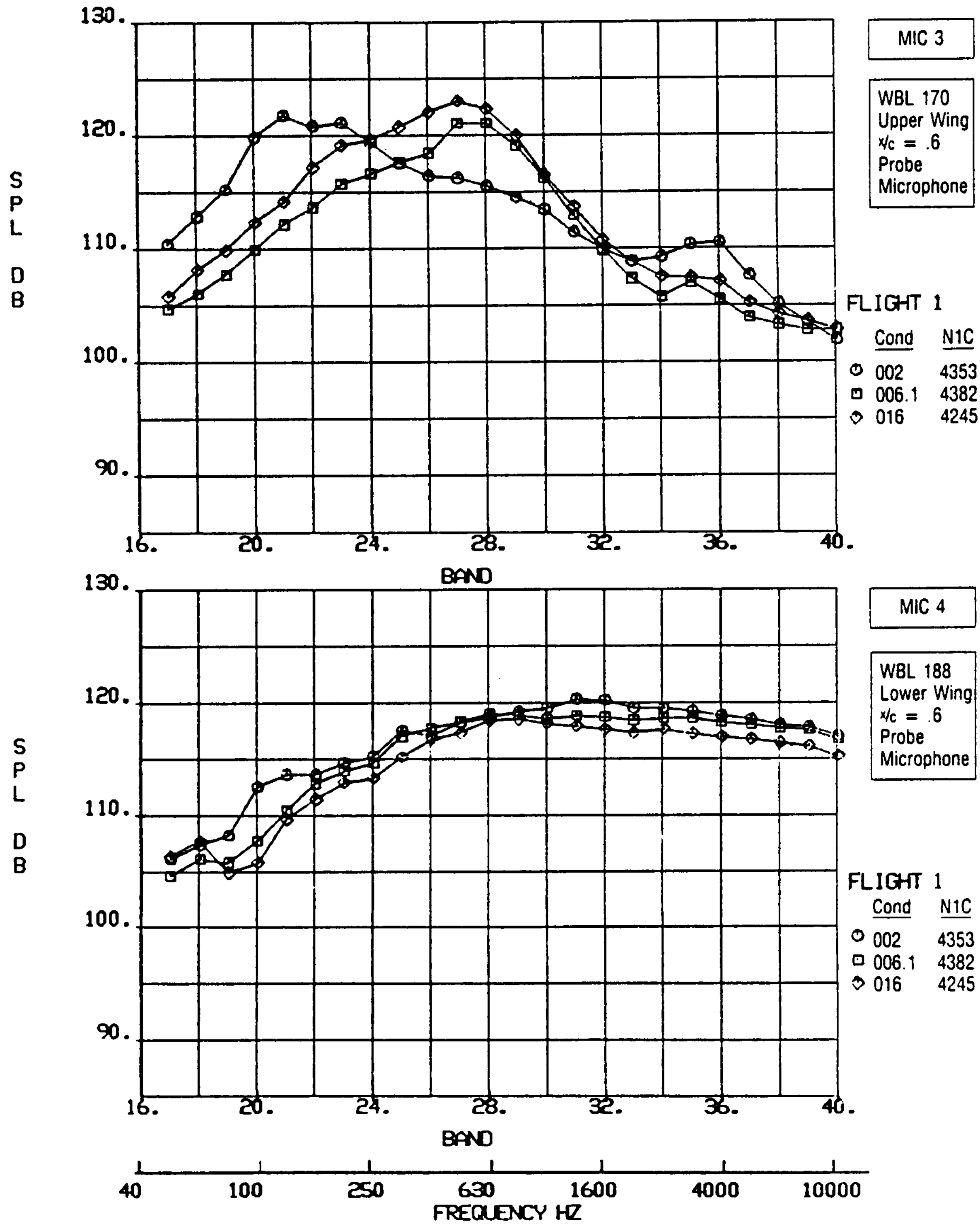


Figure 5-12. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

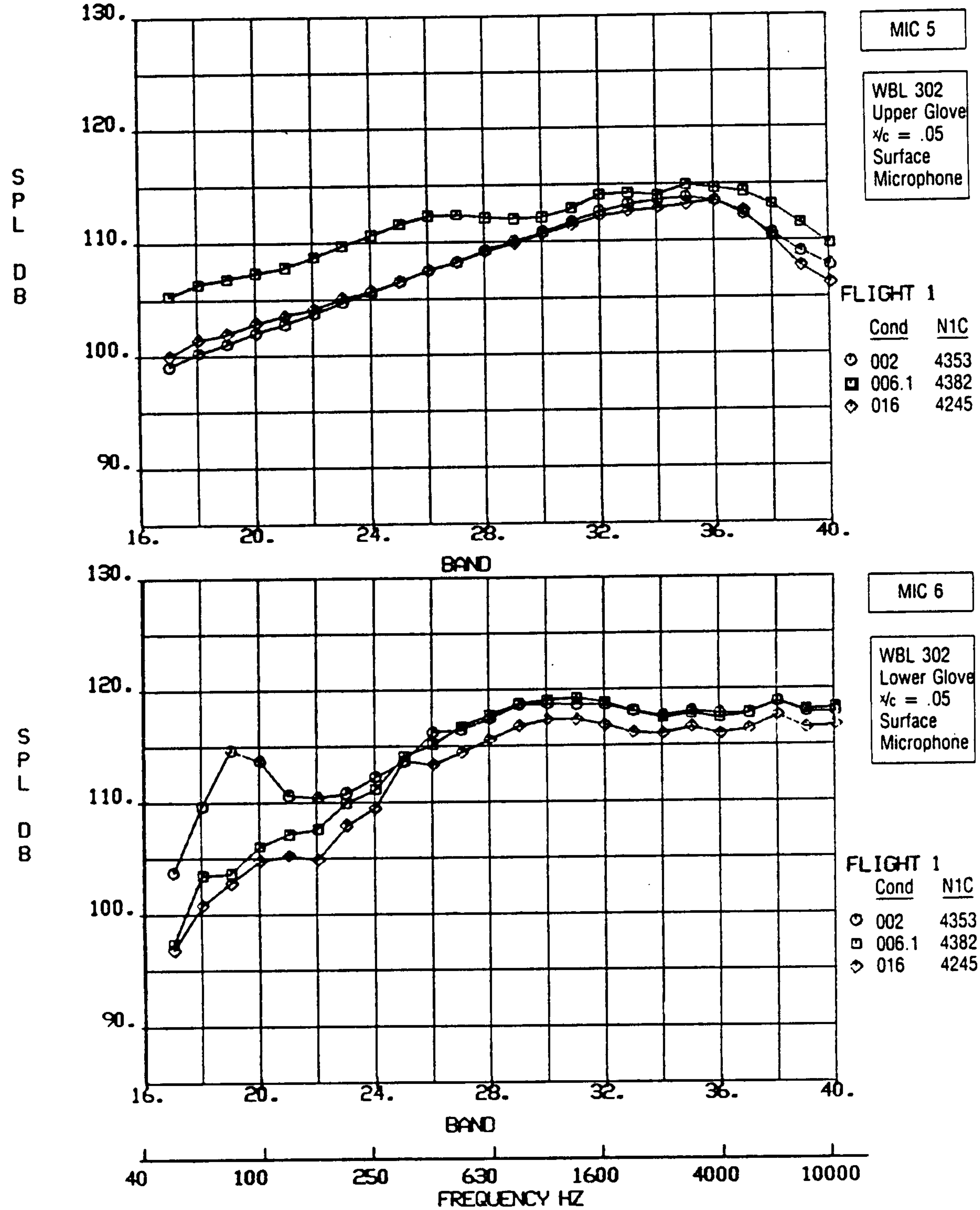


Figure 5-13. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

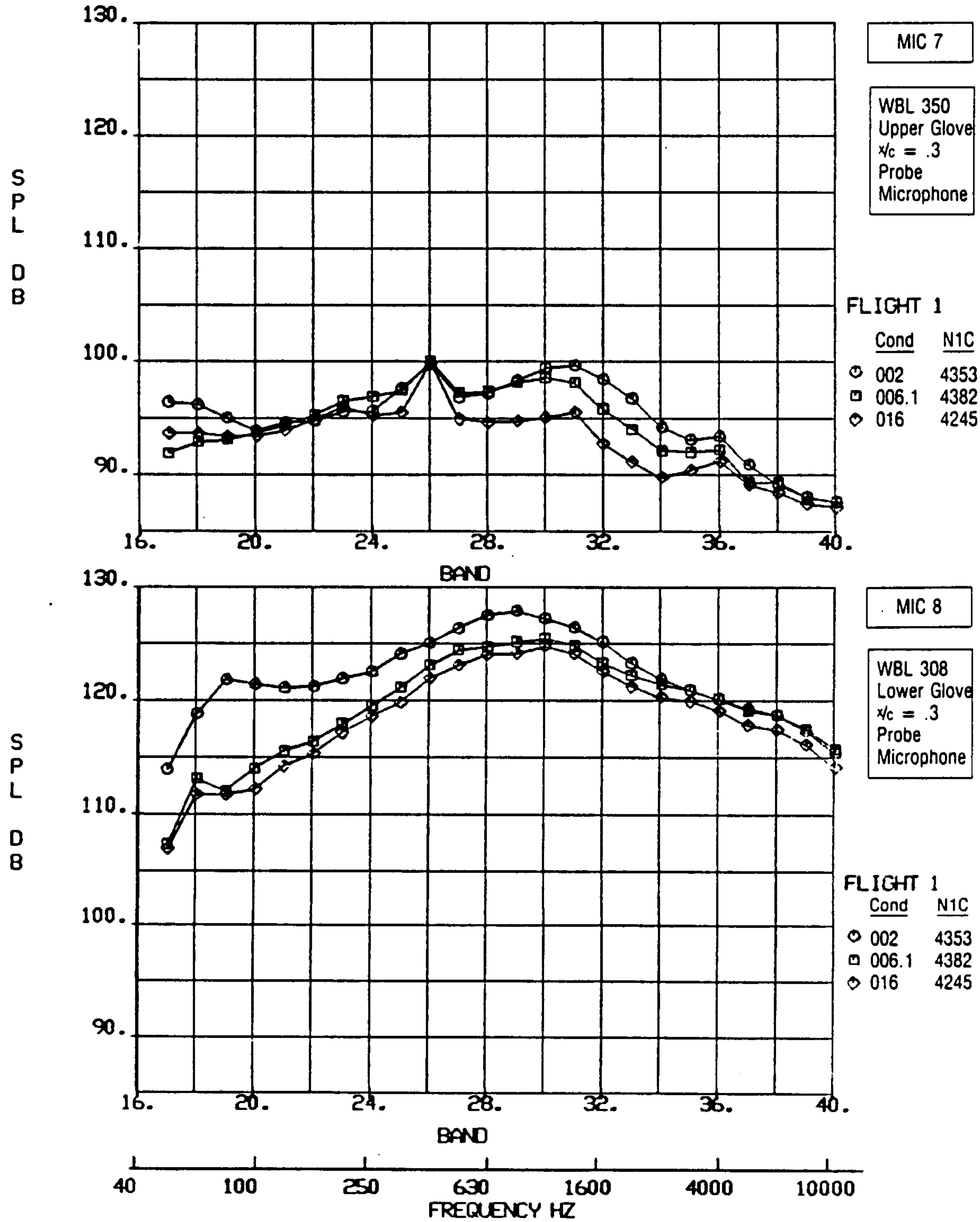


Figure 5-14. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

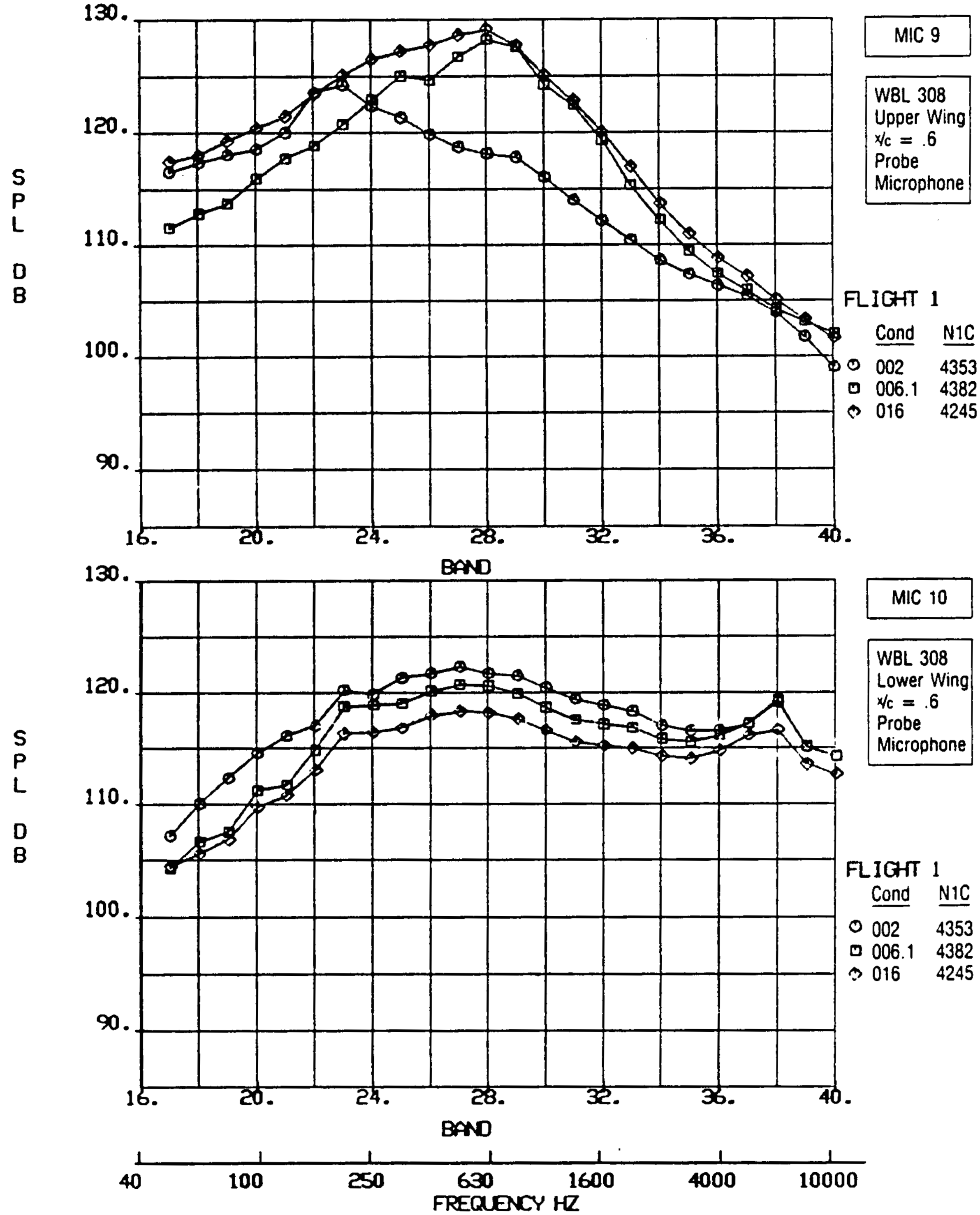


Figure 5-15. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

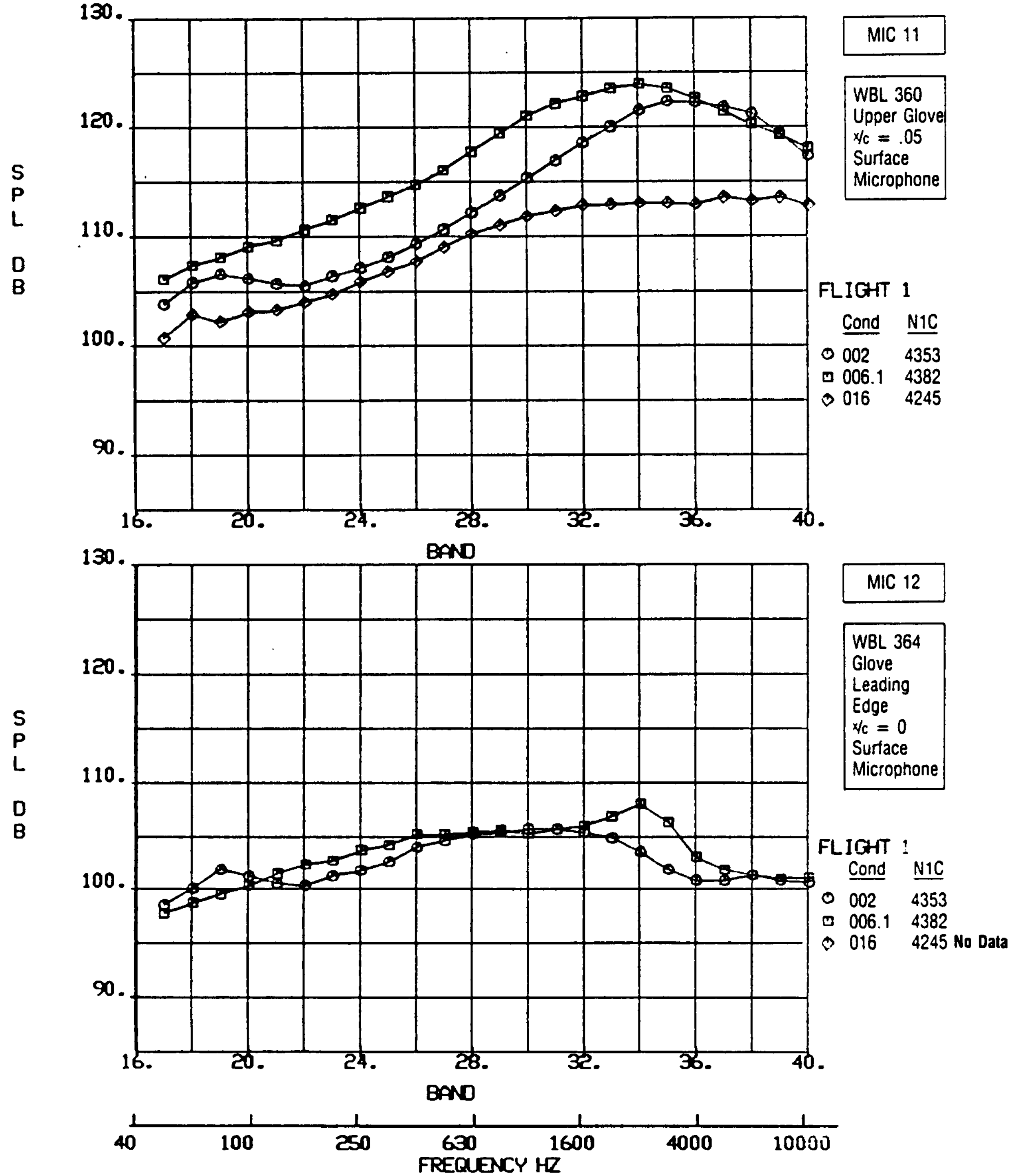


Figure 5-16. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

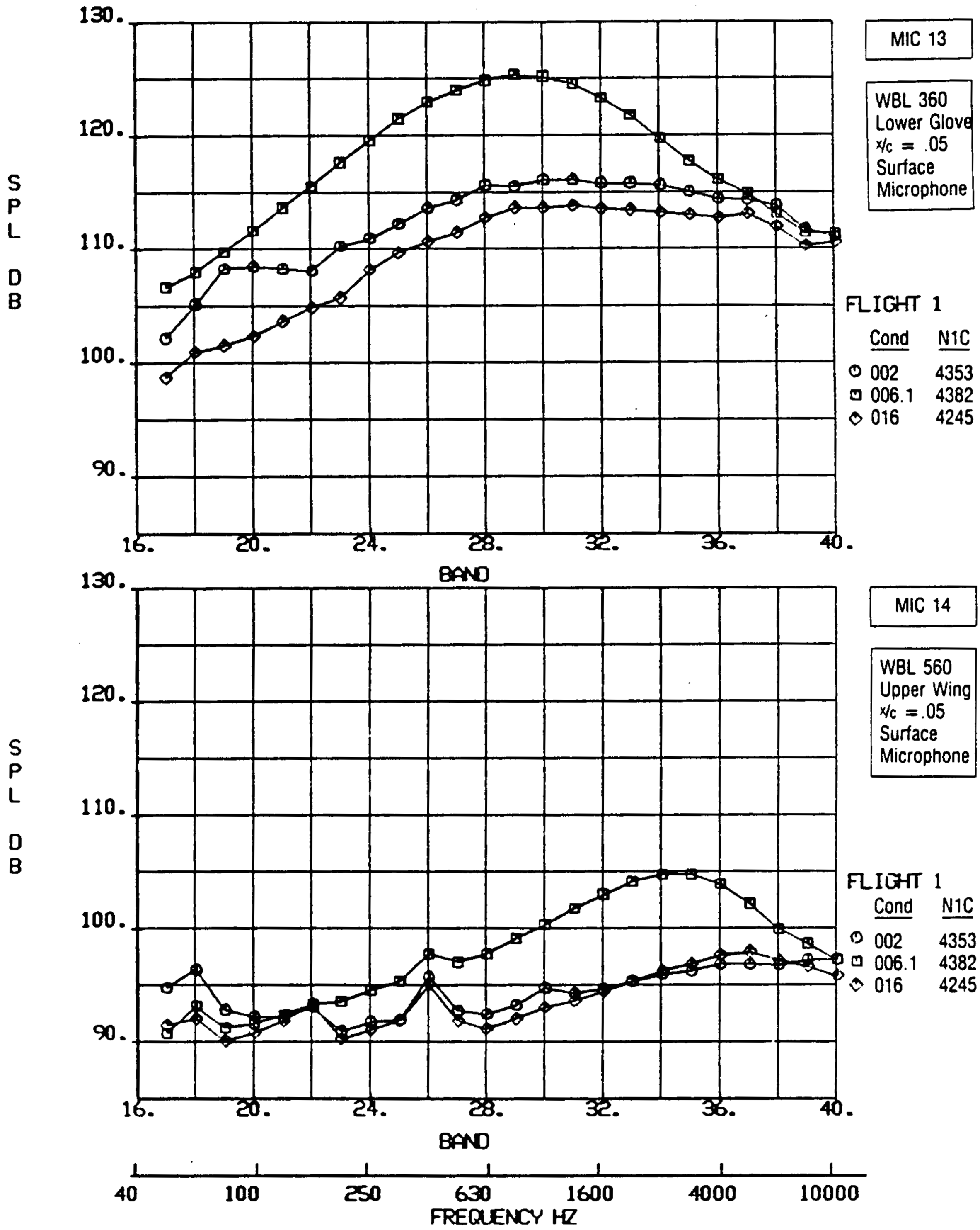


Figure 5-17. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

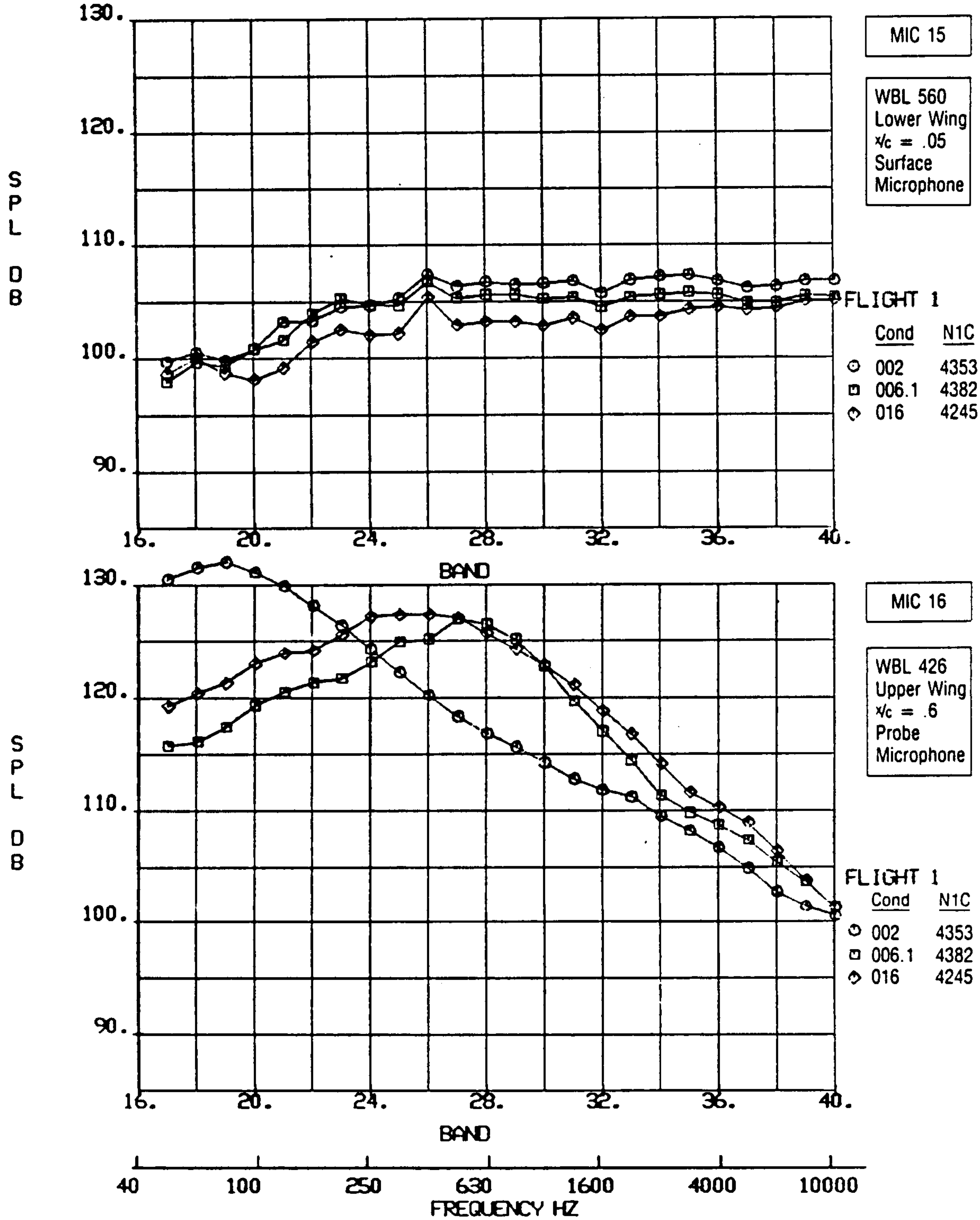


Figure 5-18. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

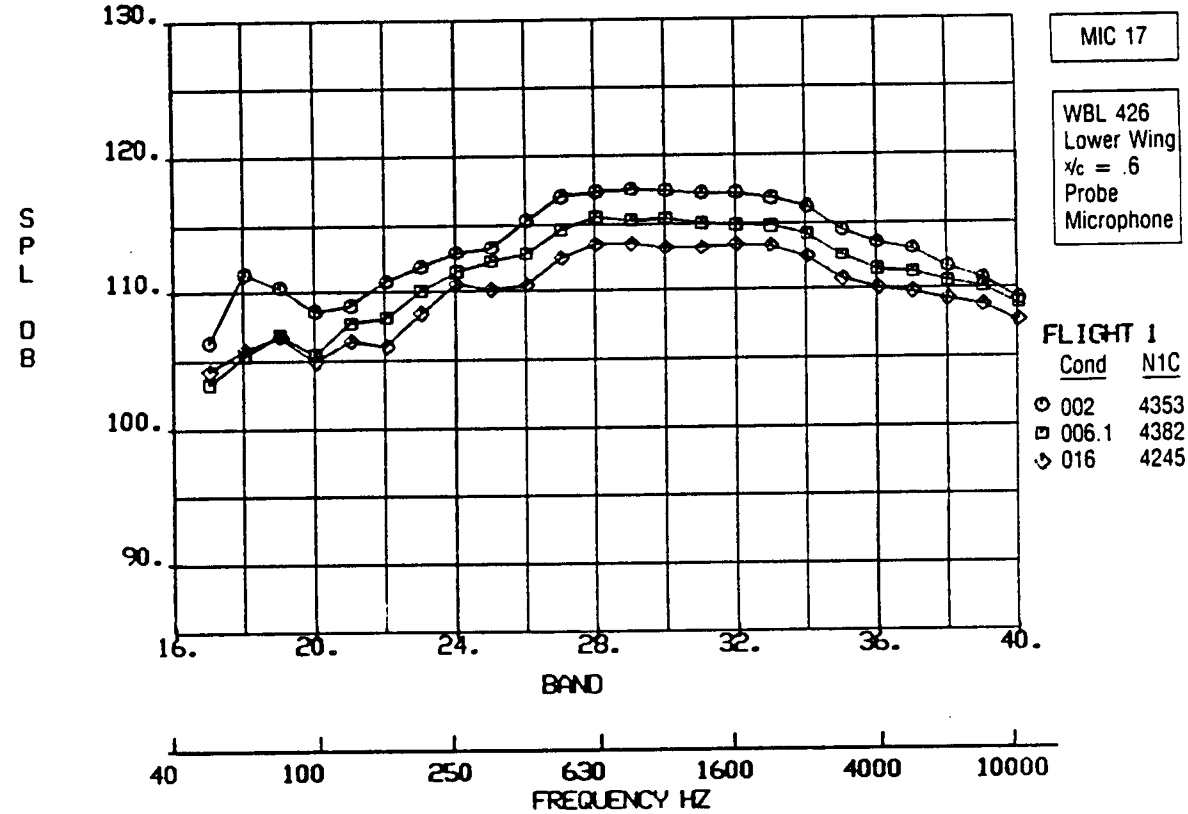


Figure 5-19. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 2, Positive Sideslip

Table 5-10. Flight 1, Category 3, Negative Sideslip

Figures 5-20 through 5-28 present the one-third-octave band acoustic data for each microphone in Category 3 from Flight 1. Pertinent data corresponding to the Category 3, Flight 1 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
006.2	.80	39	4348	1.28	-6.4
017	.80	41	4366	1.28	-7.1

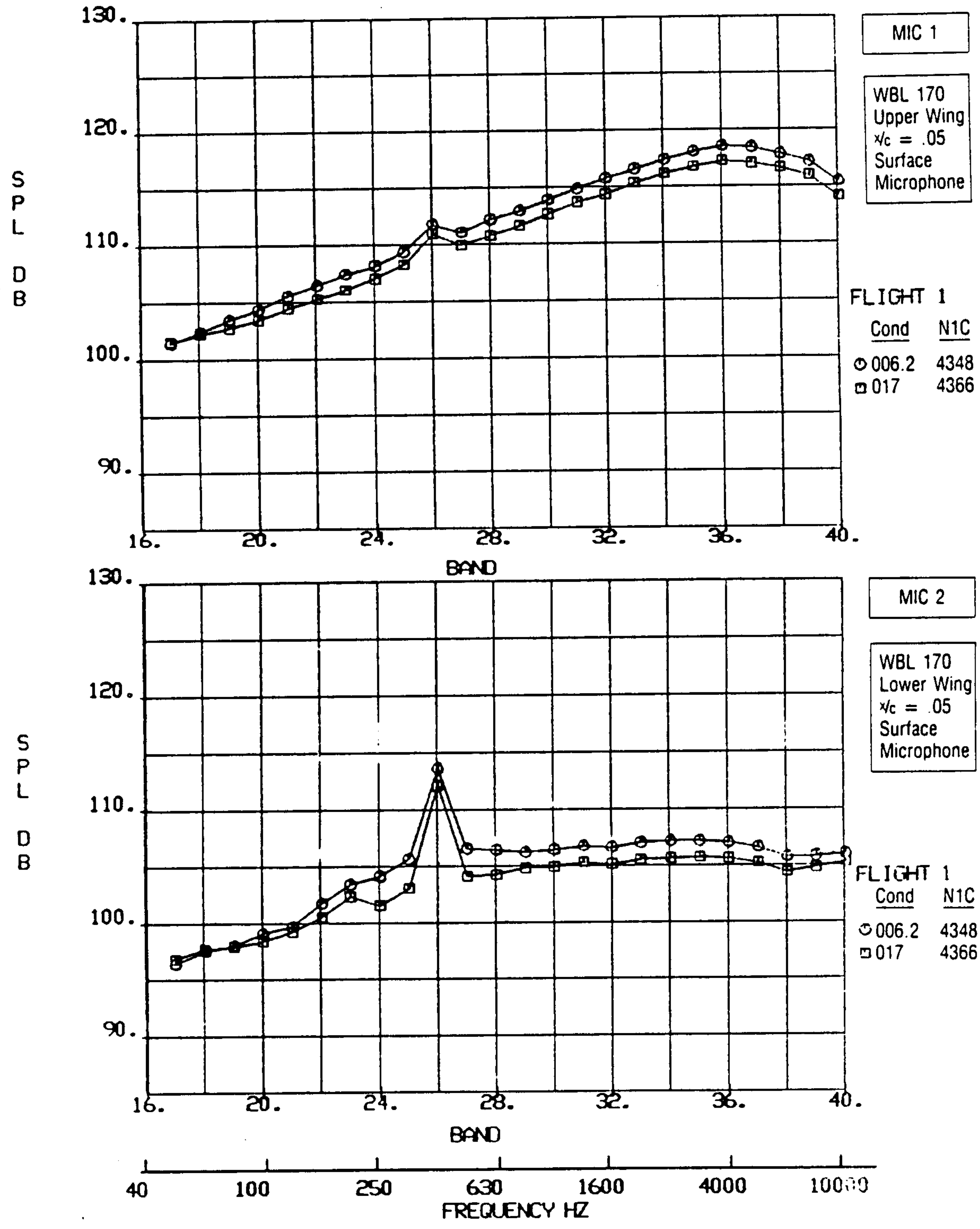


Figure 5-20. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

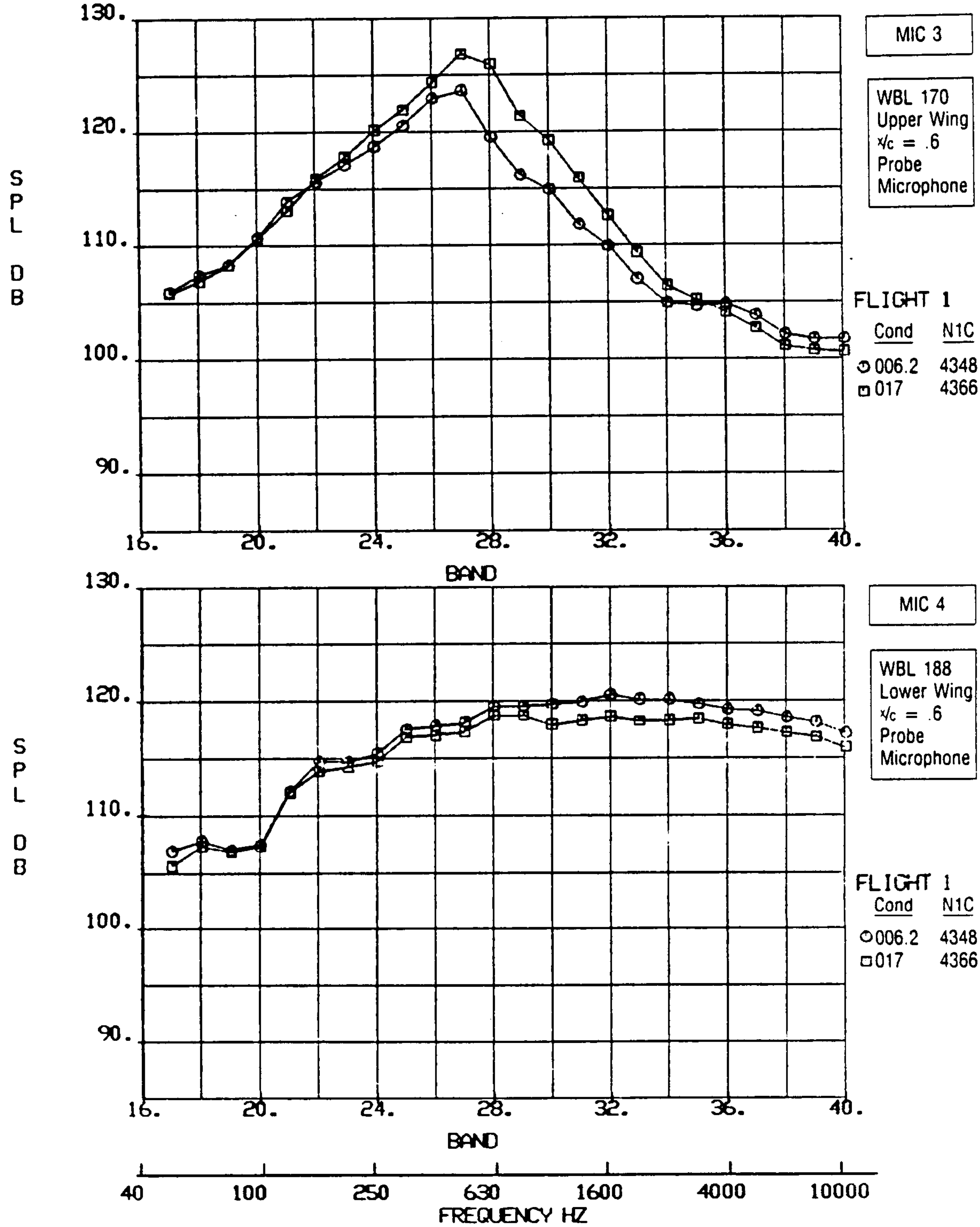


Figure 5-21. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

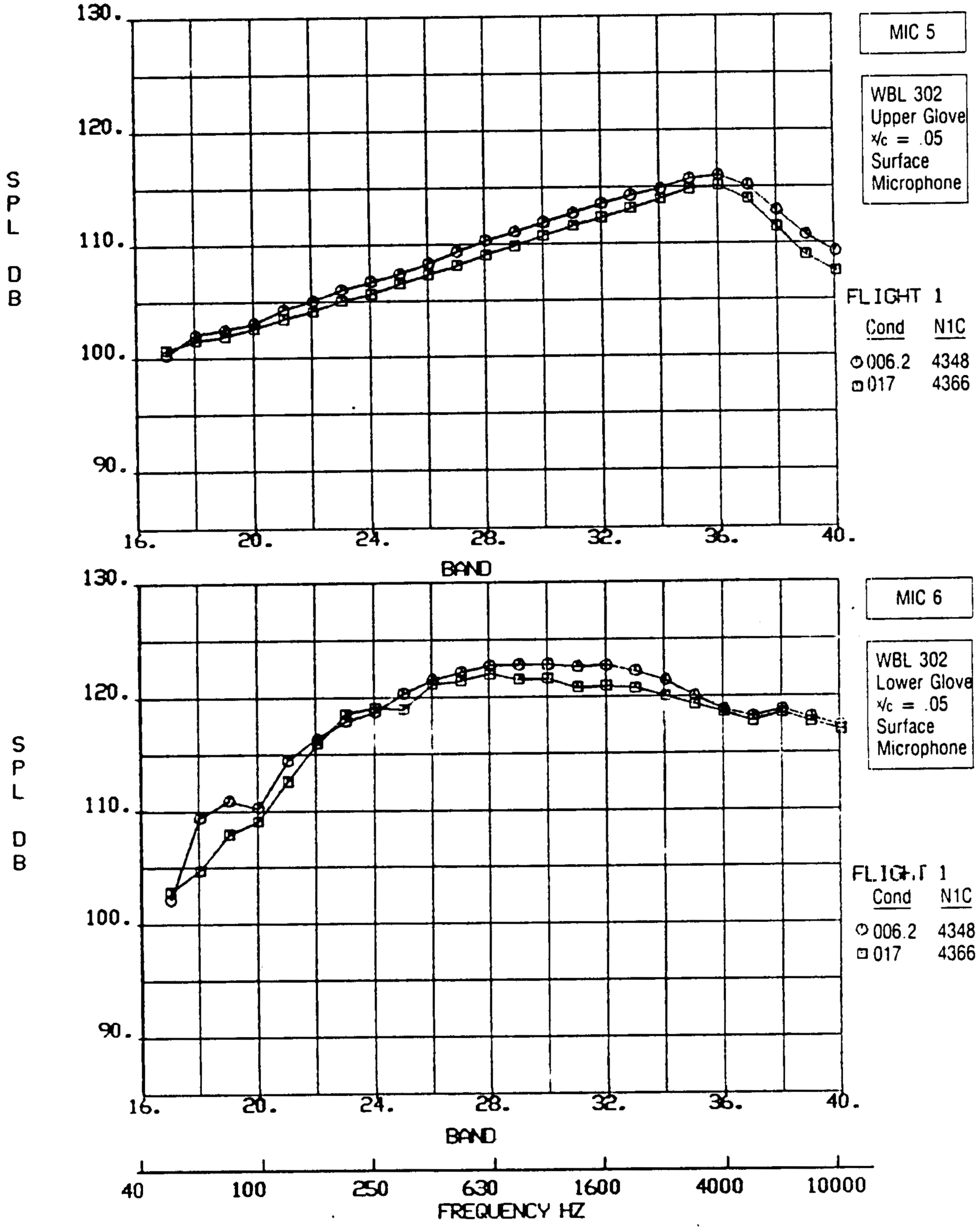


Figure 5-22. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

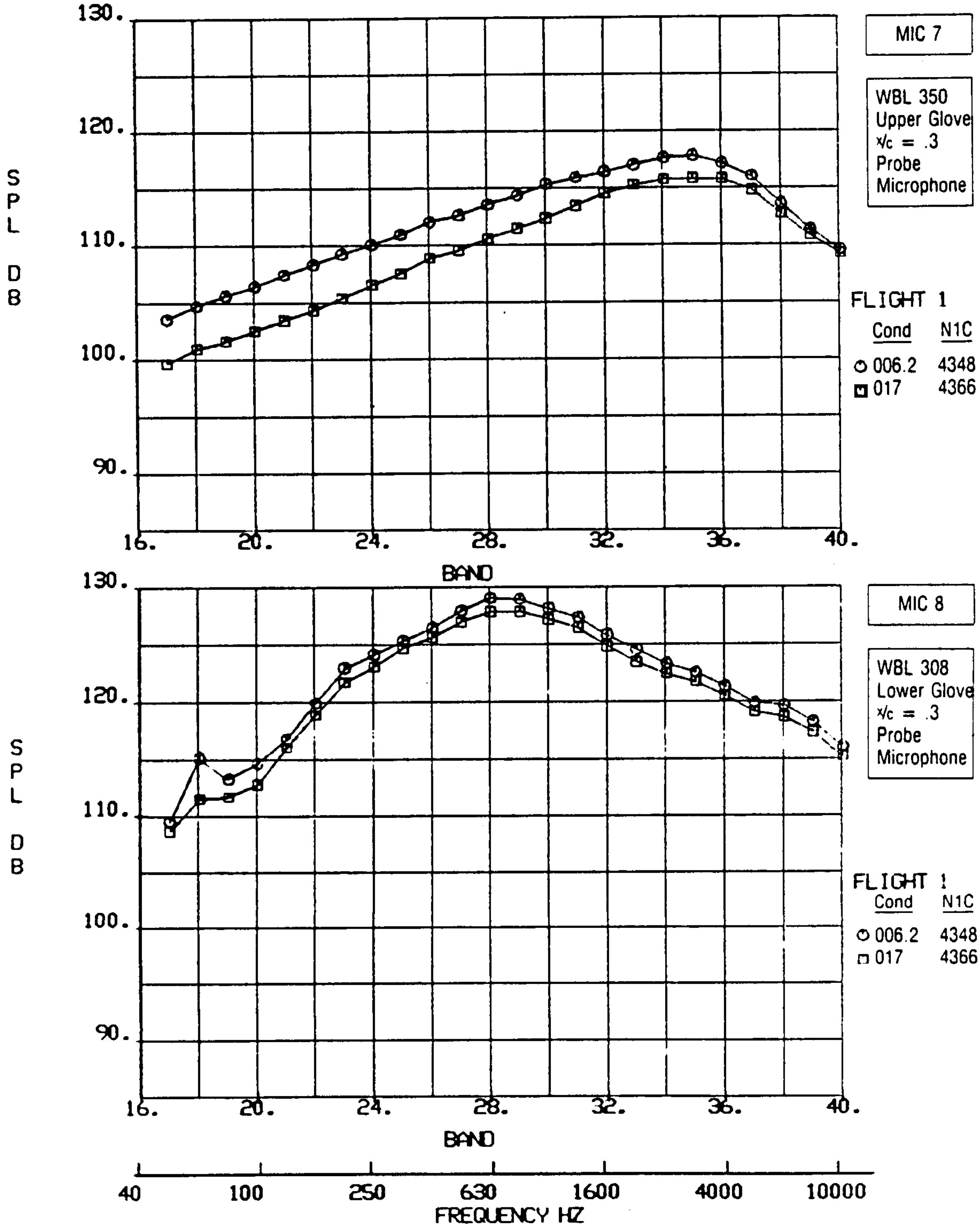


Figure 5-23. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

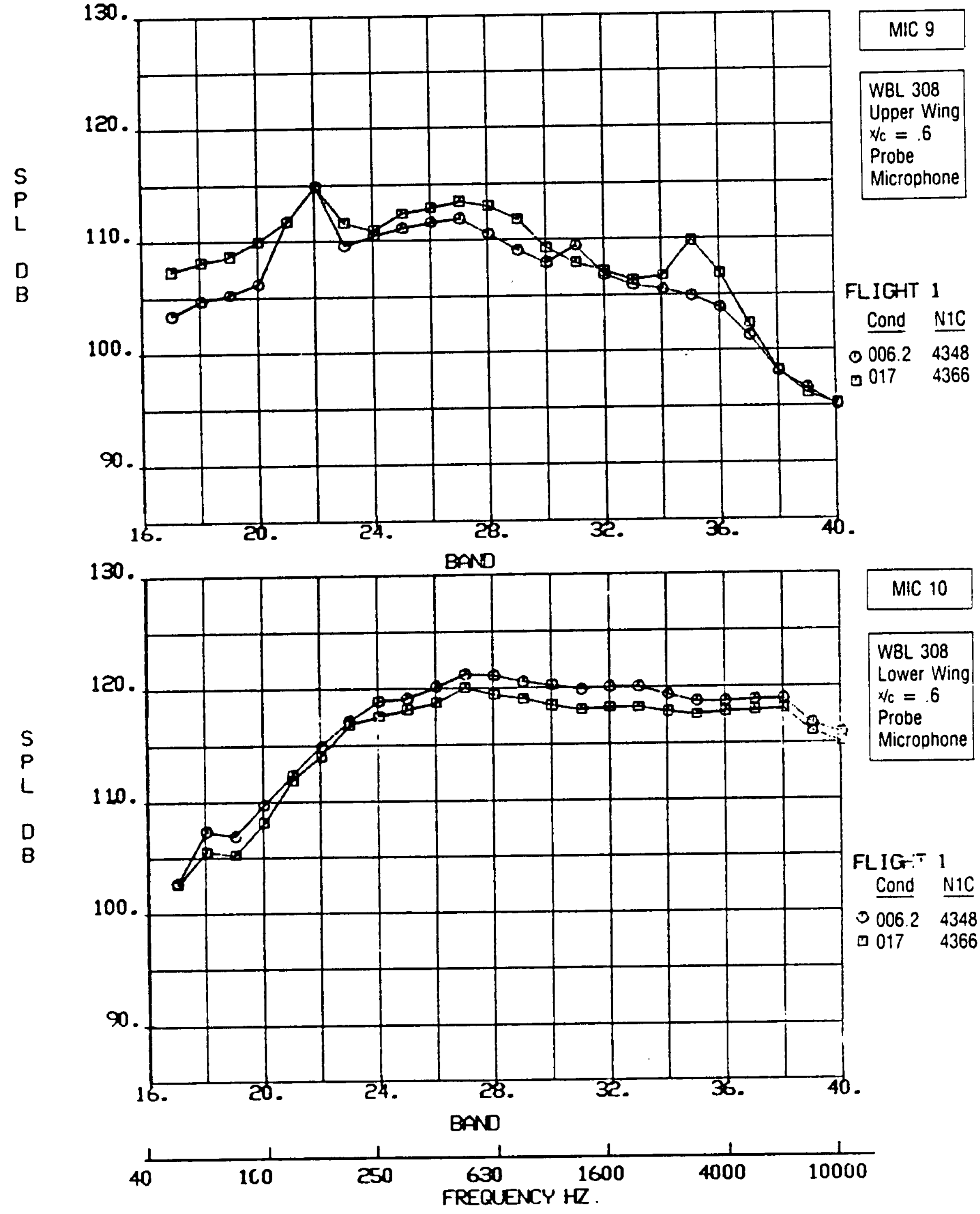


Figure 5-24. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

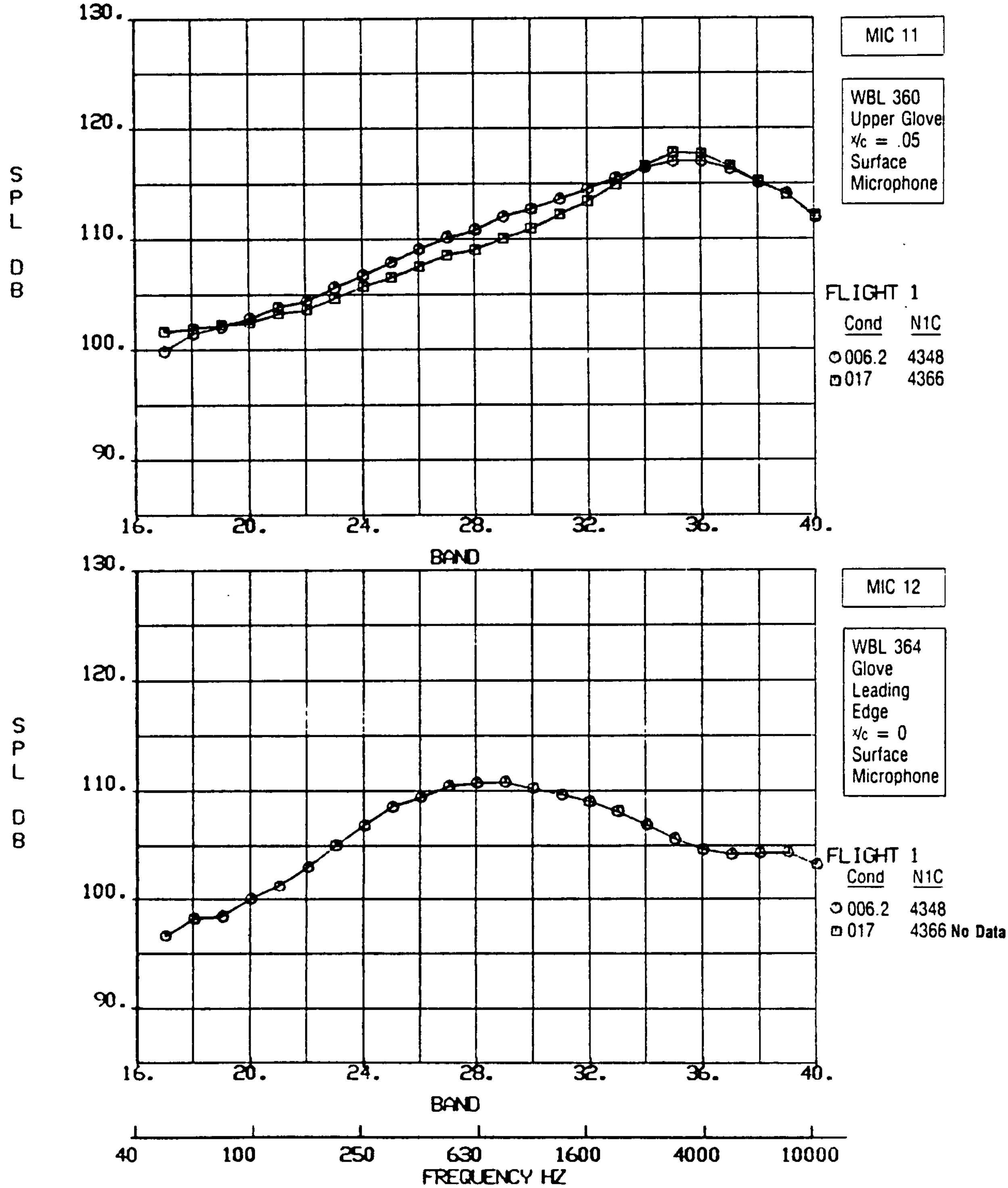


Figure 5-25. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

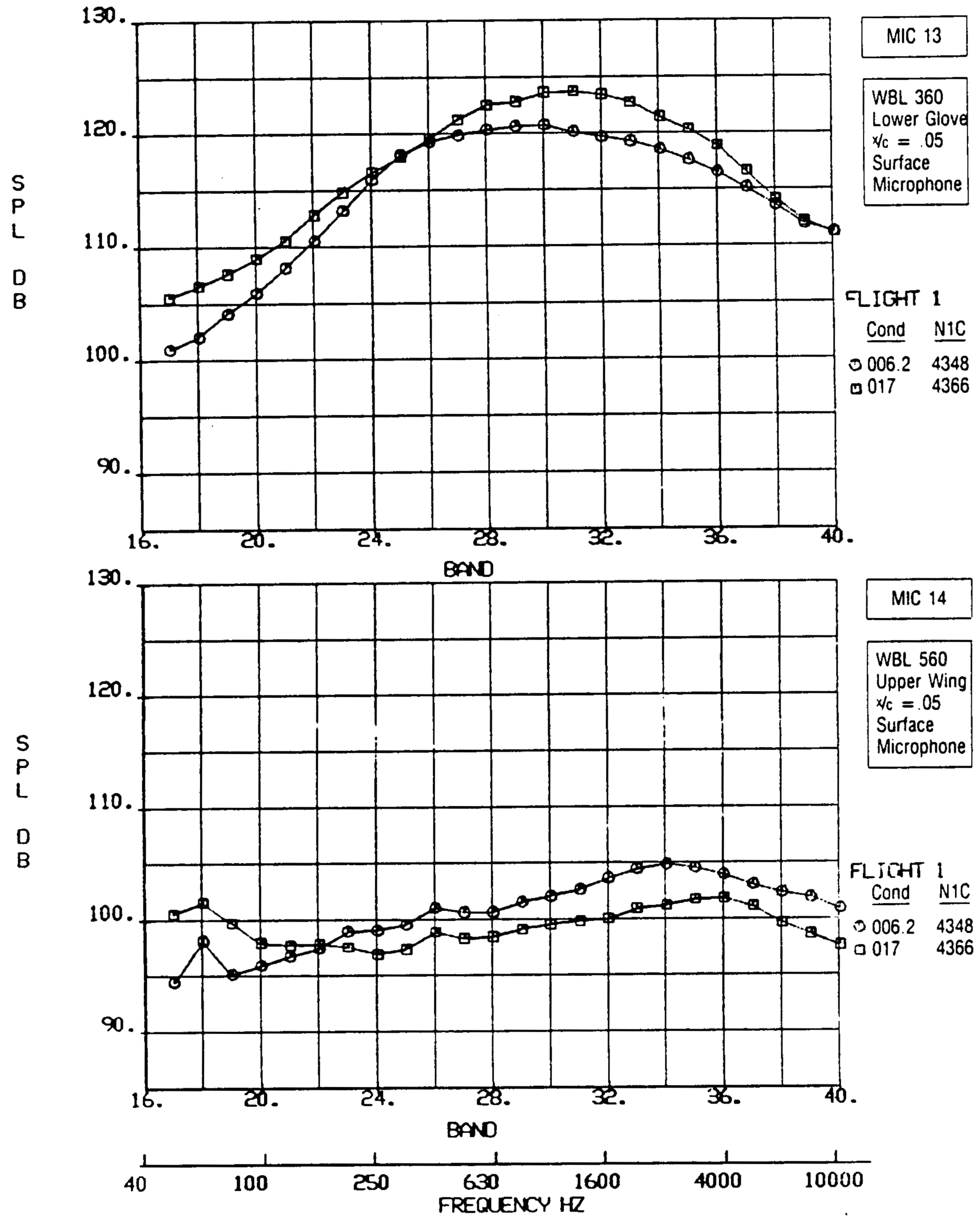
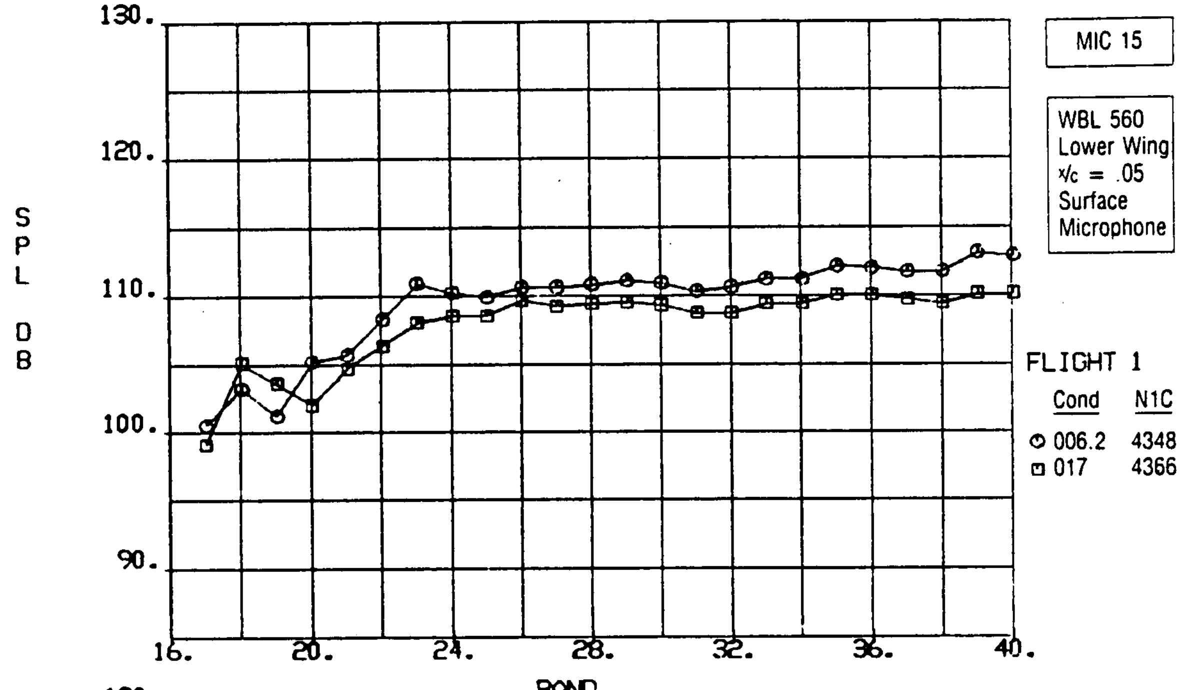


Figure 5-26. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip



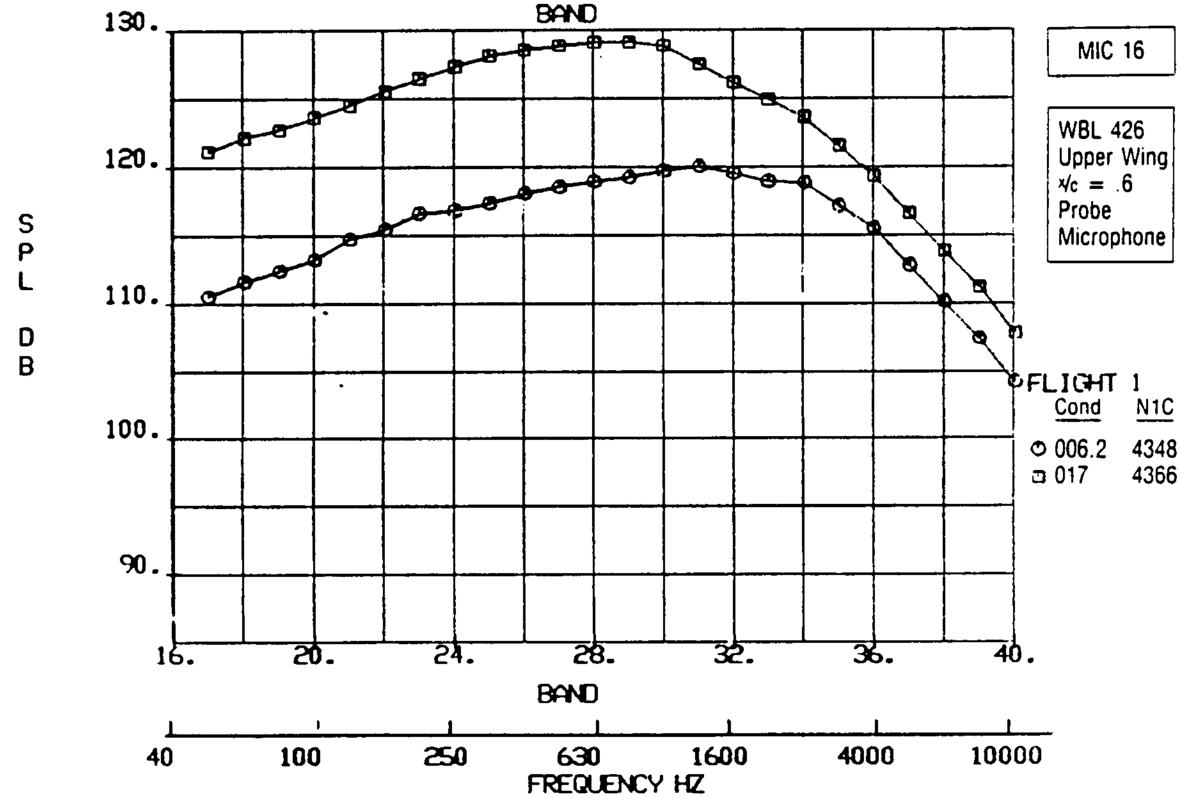


Figure 5-27. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

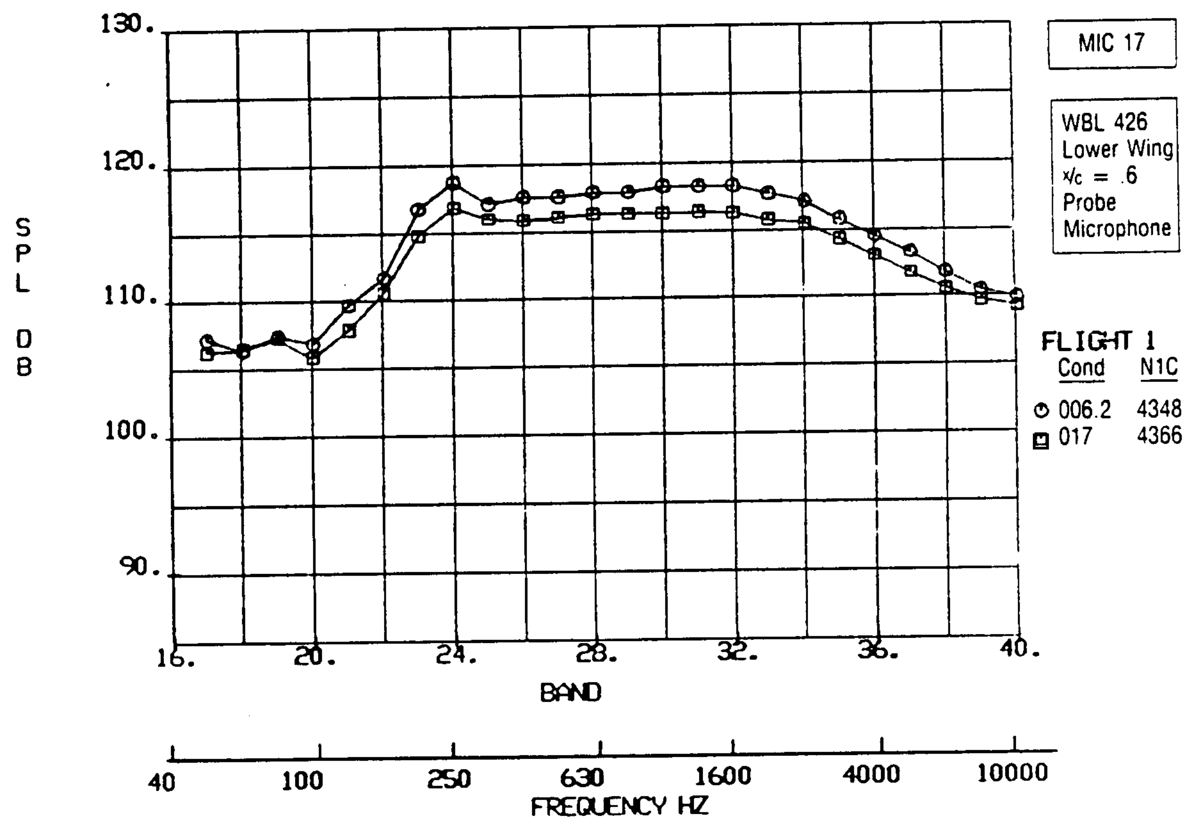


Figure 5-28. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 3, Negative Sideslip

Table 5-11. Flight 1, Category 6, Engine Power Variation, M_{AP} = 0.80

Figures 5-29 through 5-37 present the one-third-octave band acoustic data for each microphone in Category 6 from Flight 1. Pertinent data corresponding to the Category 6, Flight 1 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
013	.80	41	4366	1.28	0
014	.80	41	4221	1.27	0
015	.80	41	4115	1.25	0

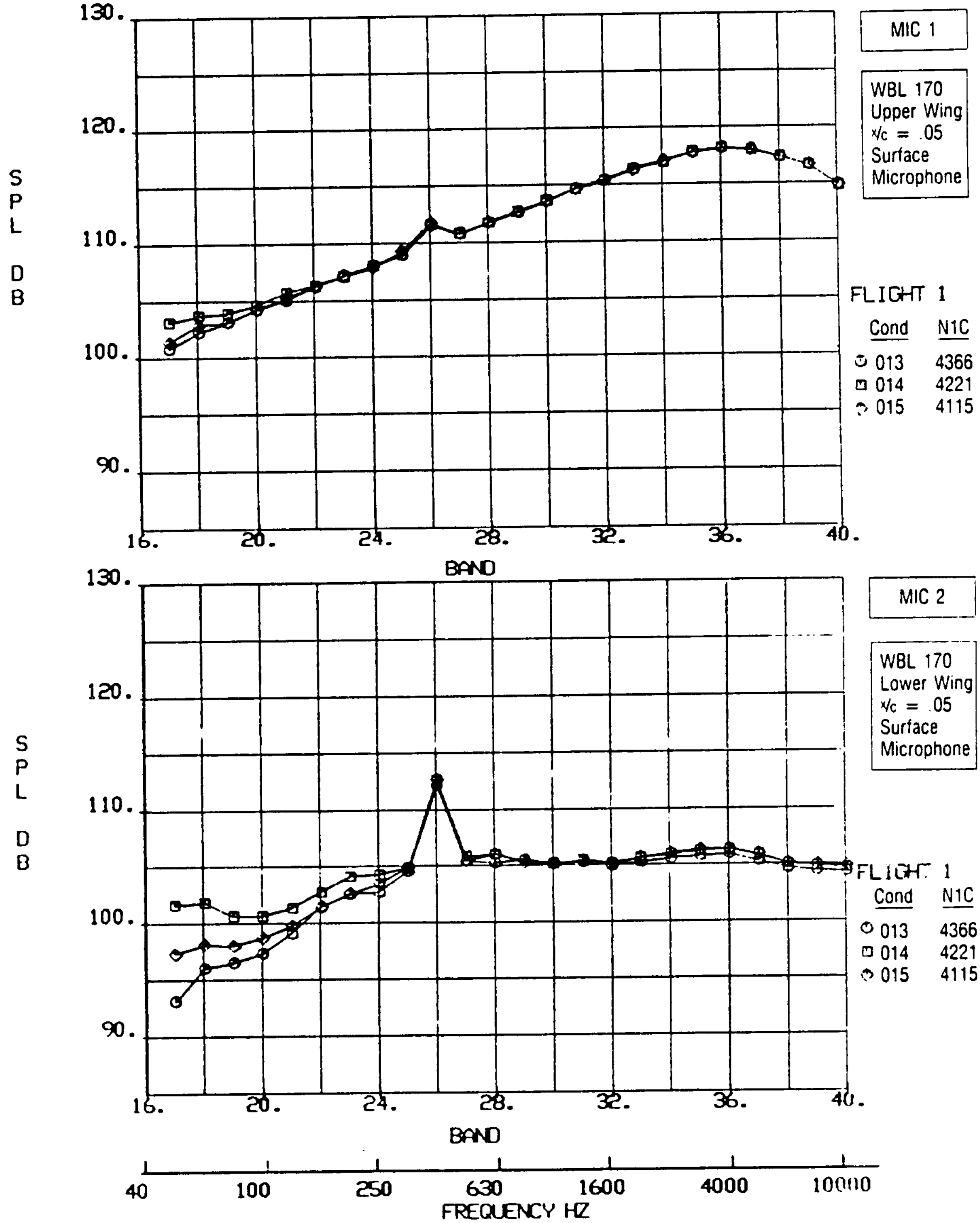


Figure 5-29. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

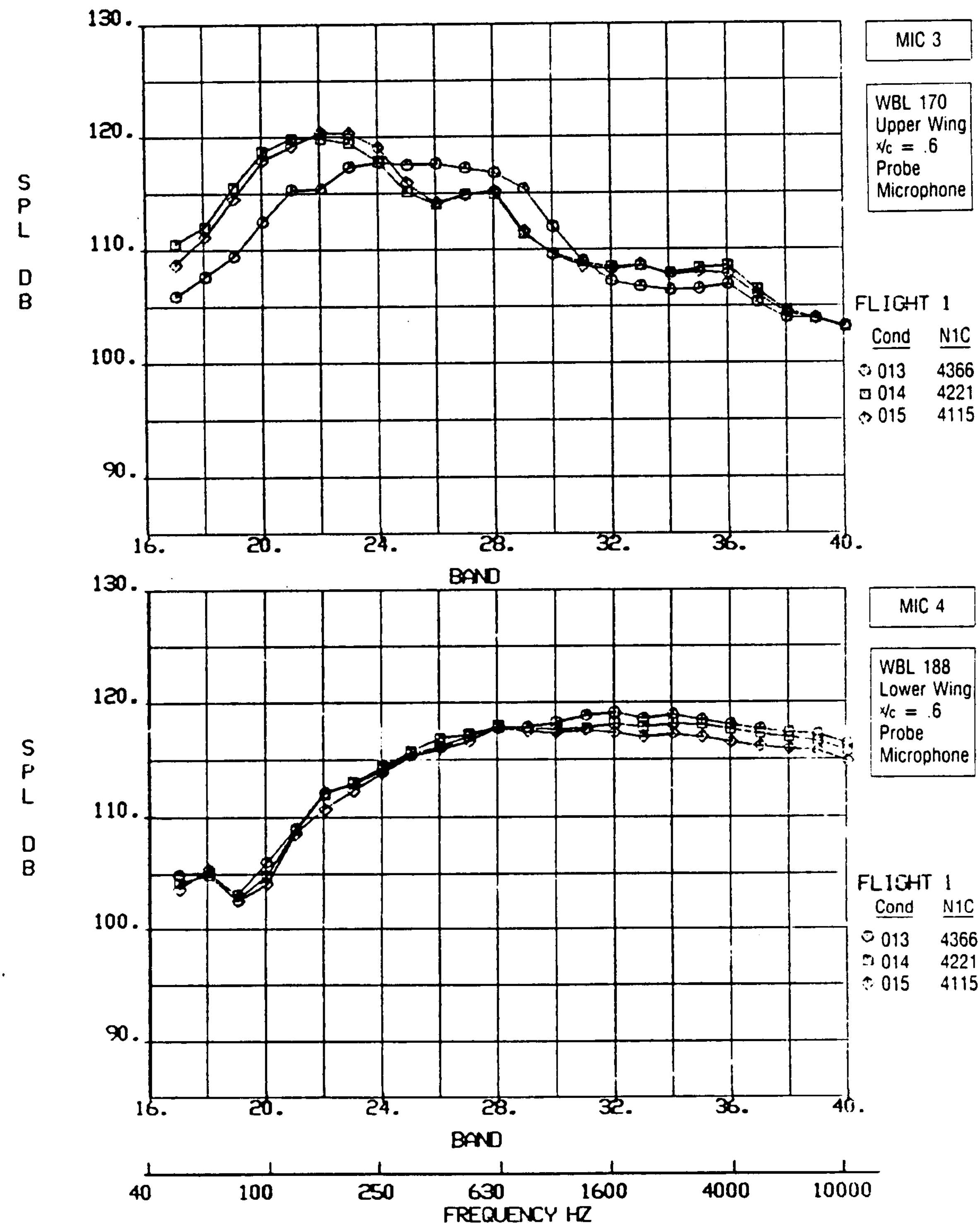


Figure 5-30. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

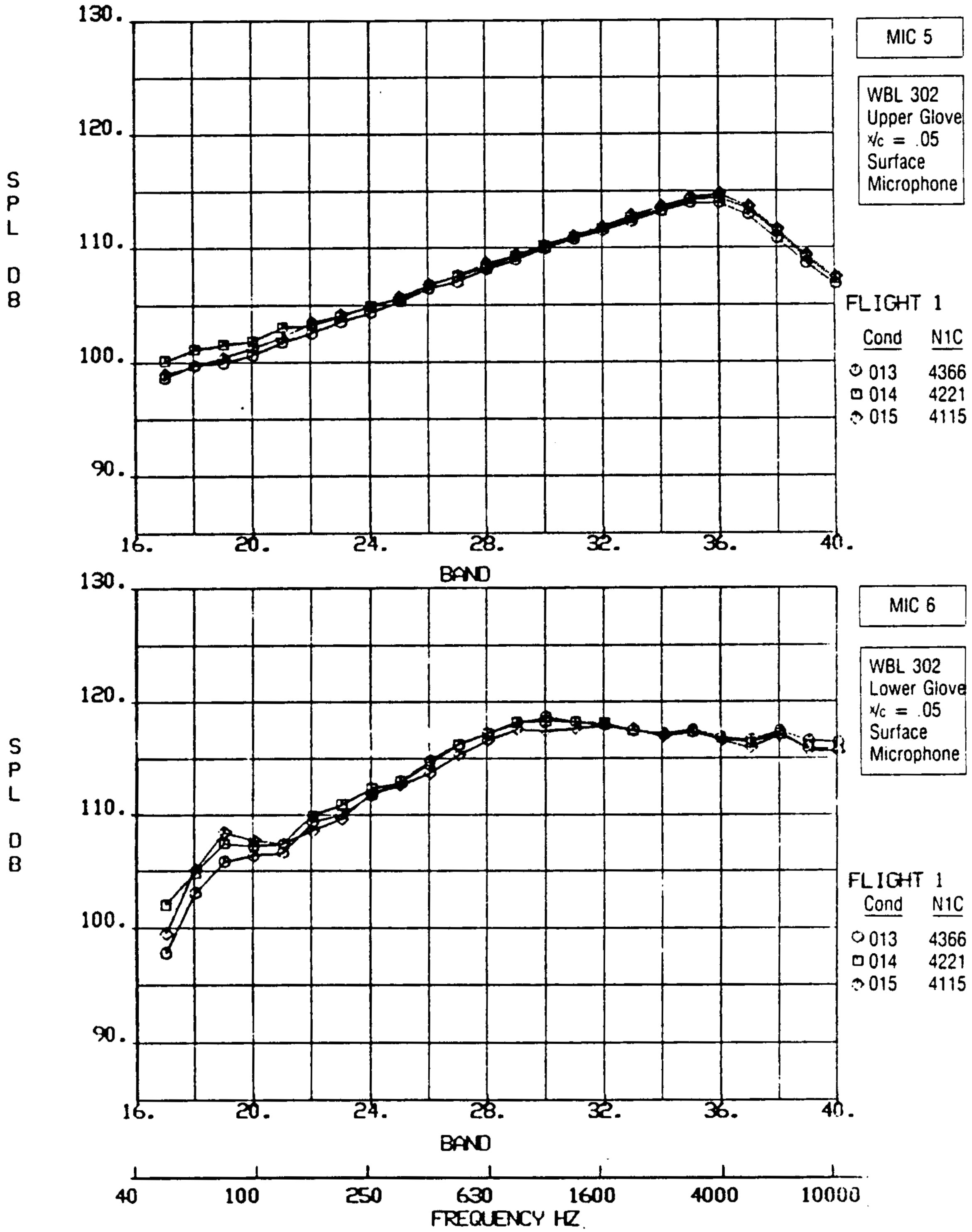
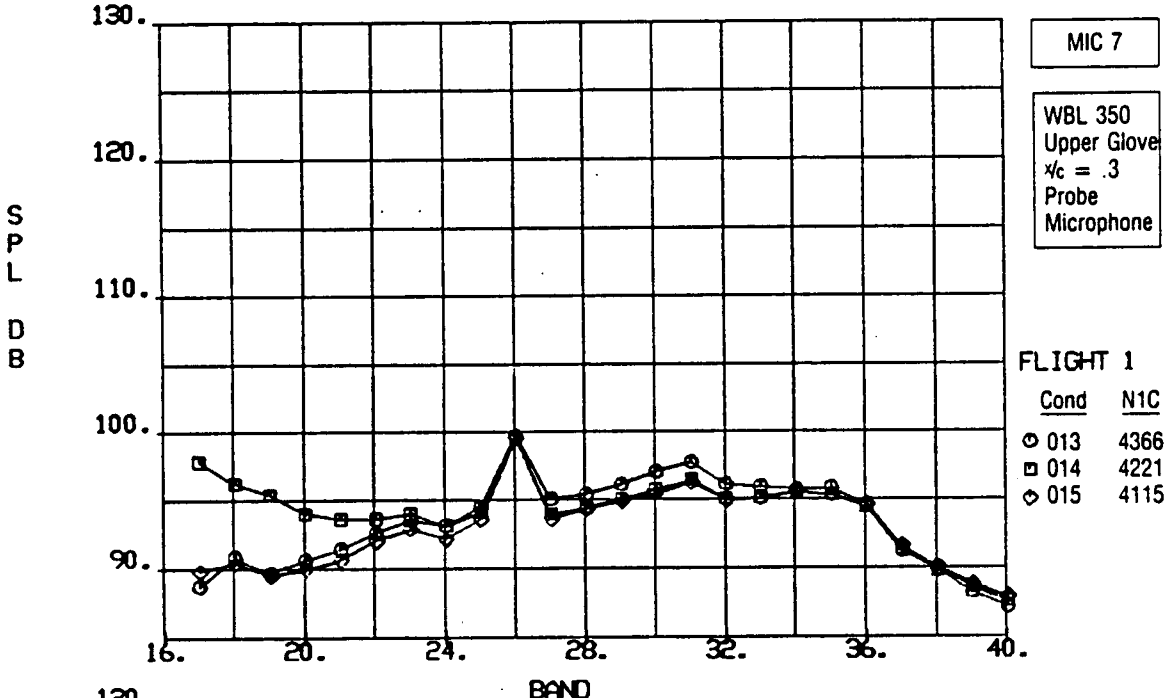


Figure 5-31. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation



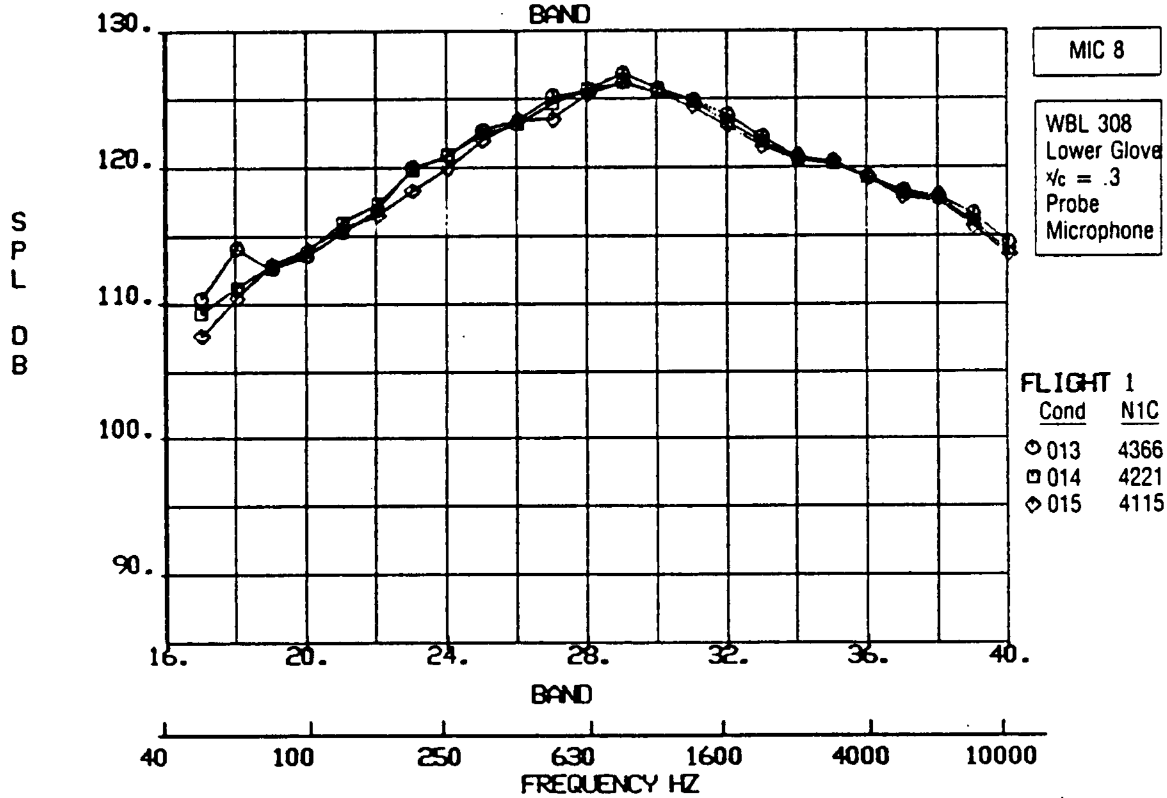


Figure 5-32. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

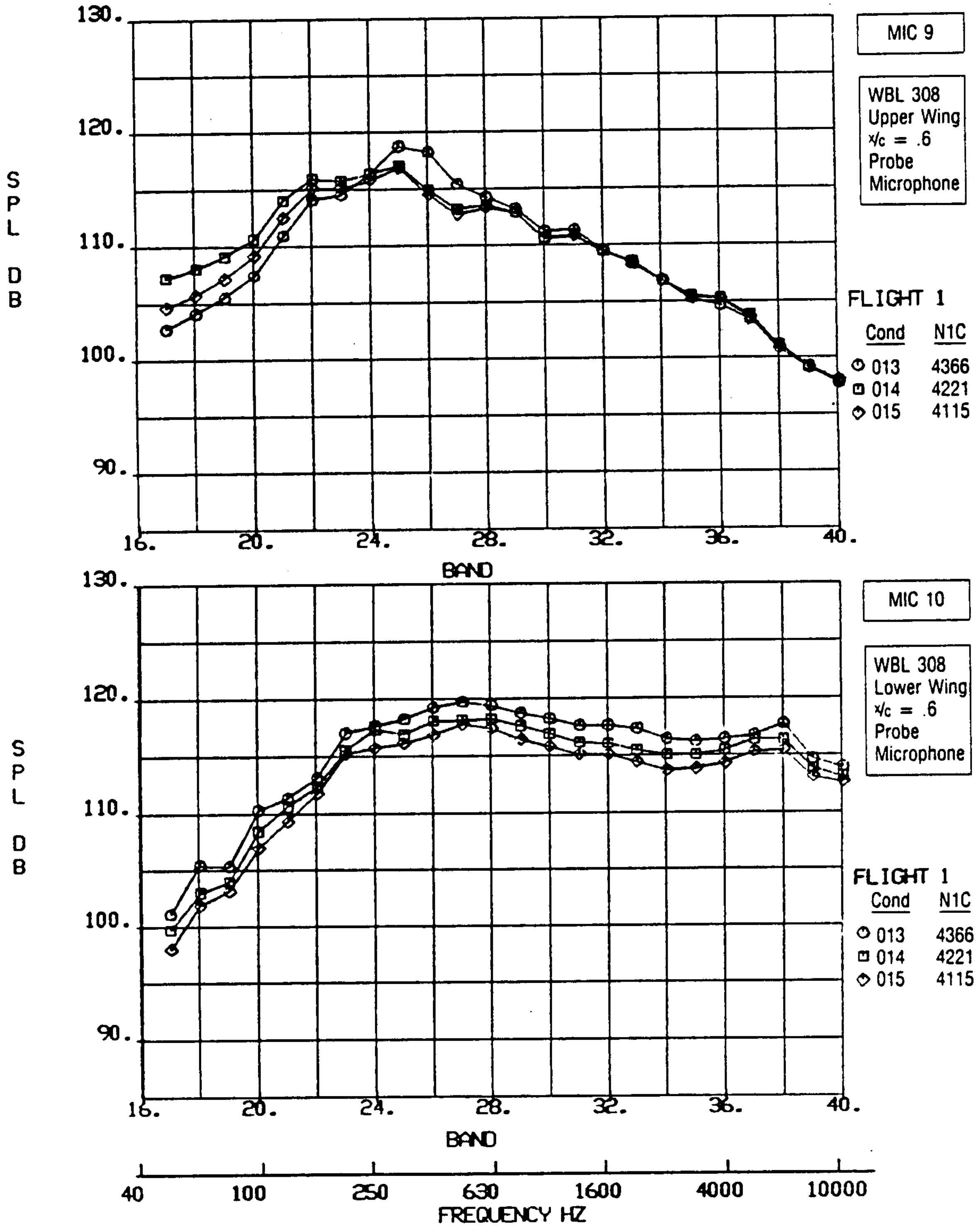
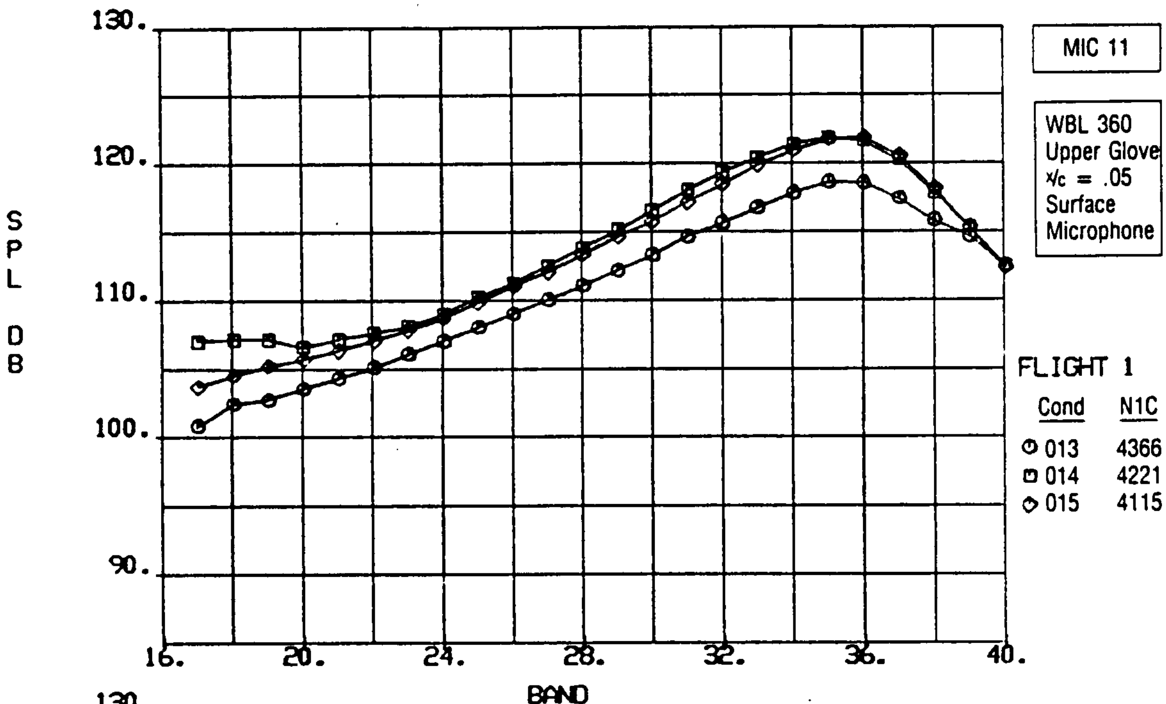


Figure 5-33. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation



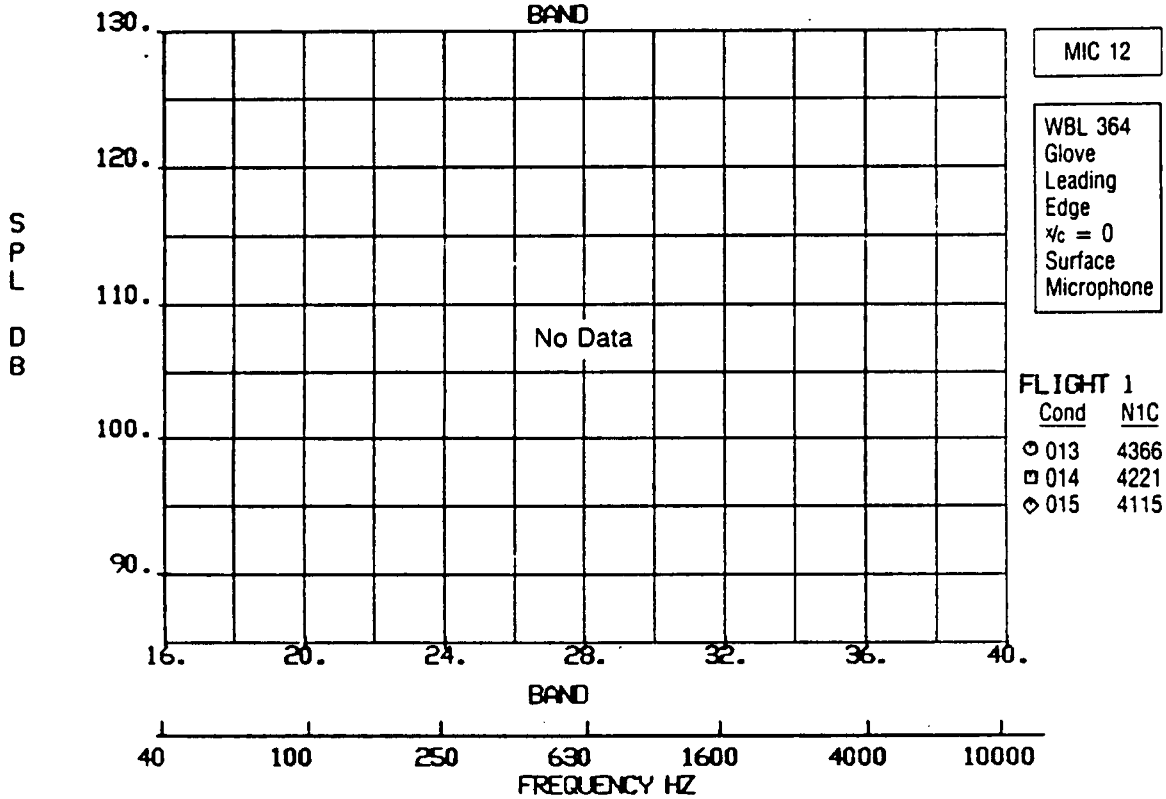


Figure 5-34. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

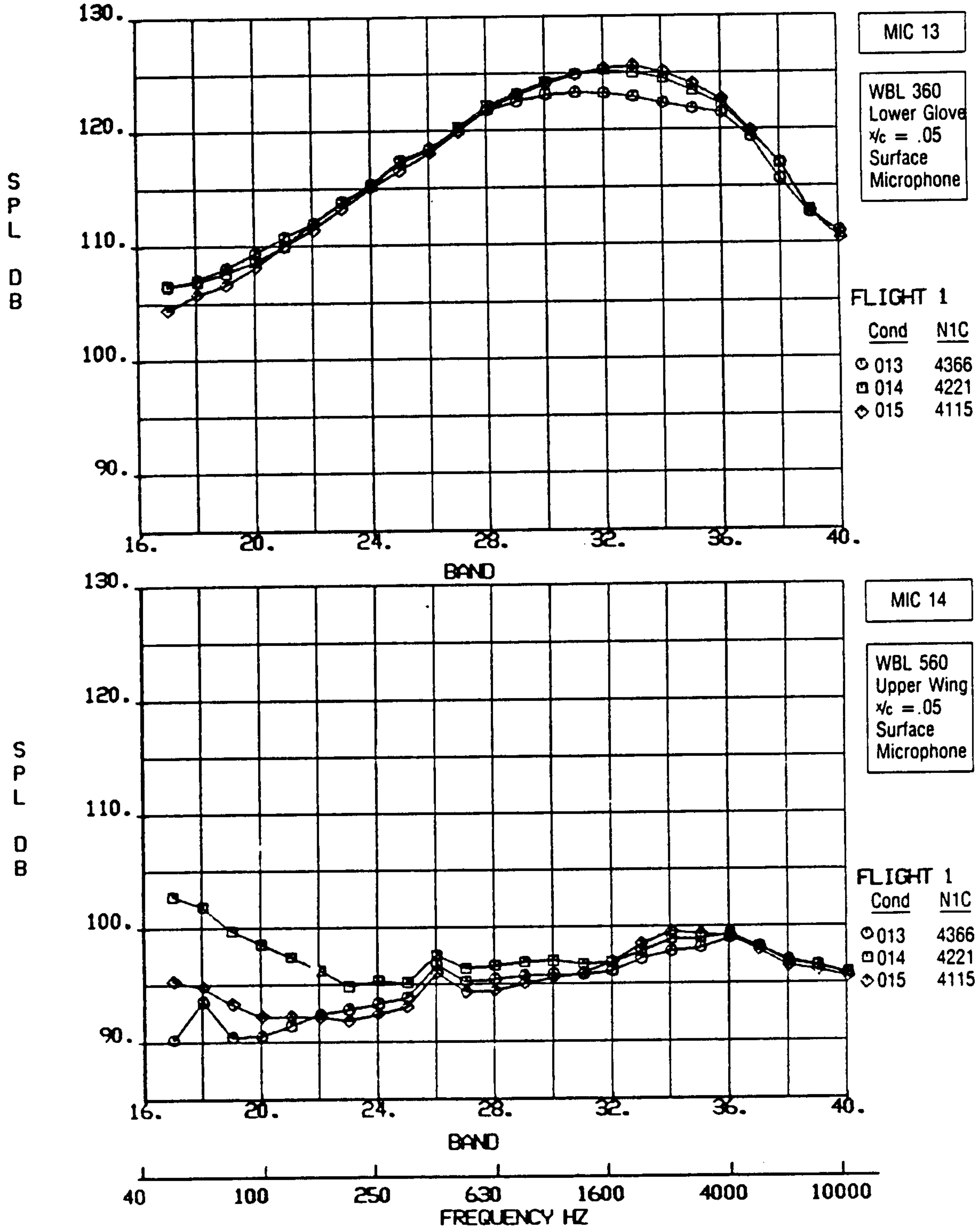


Figure 5-35. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

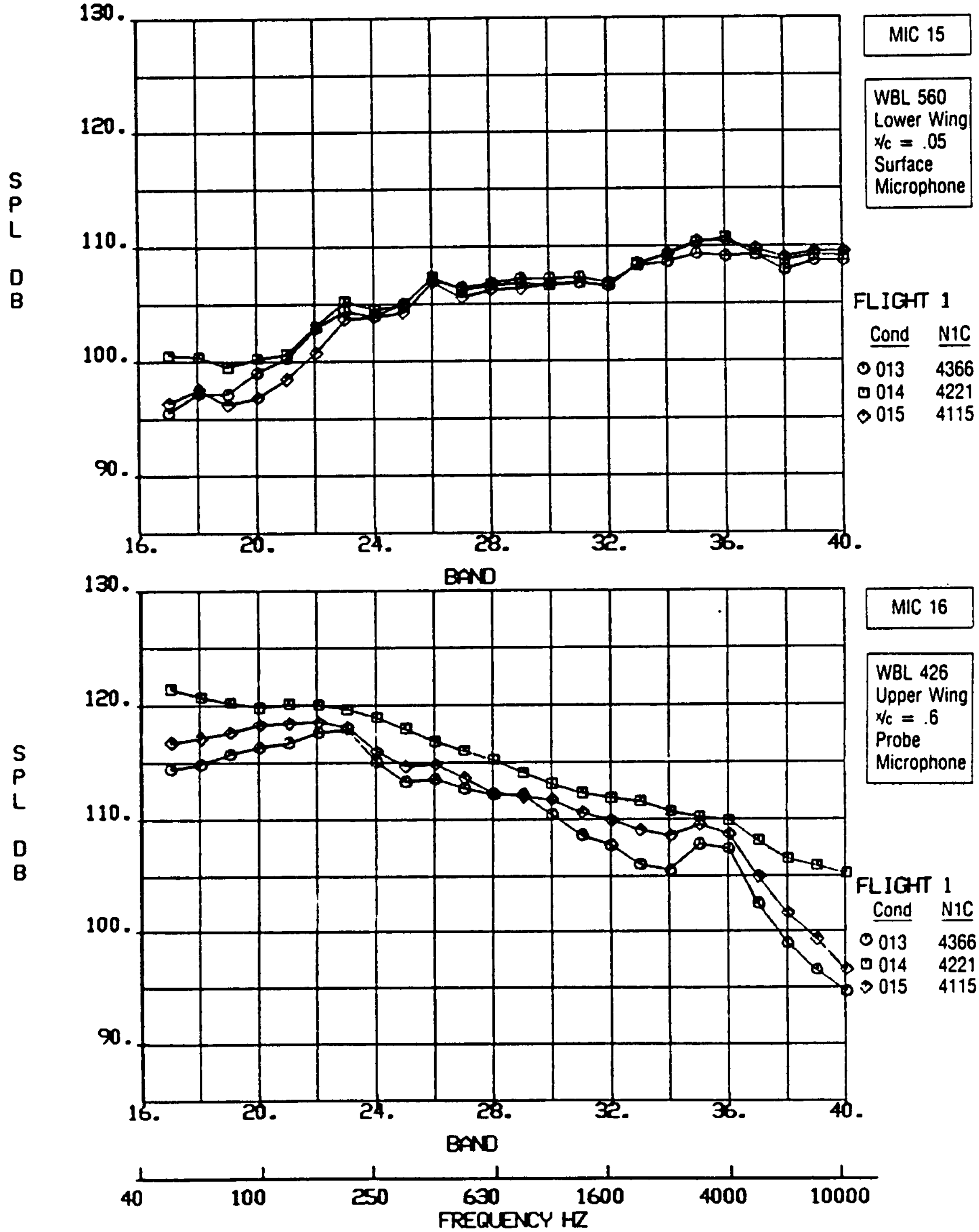


Figure 5-36. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

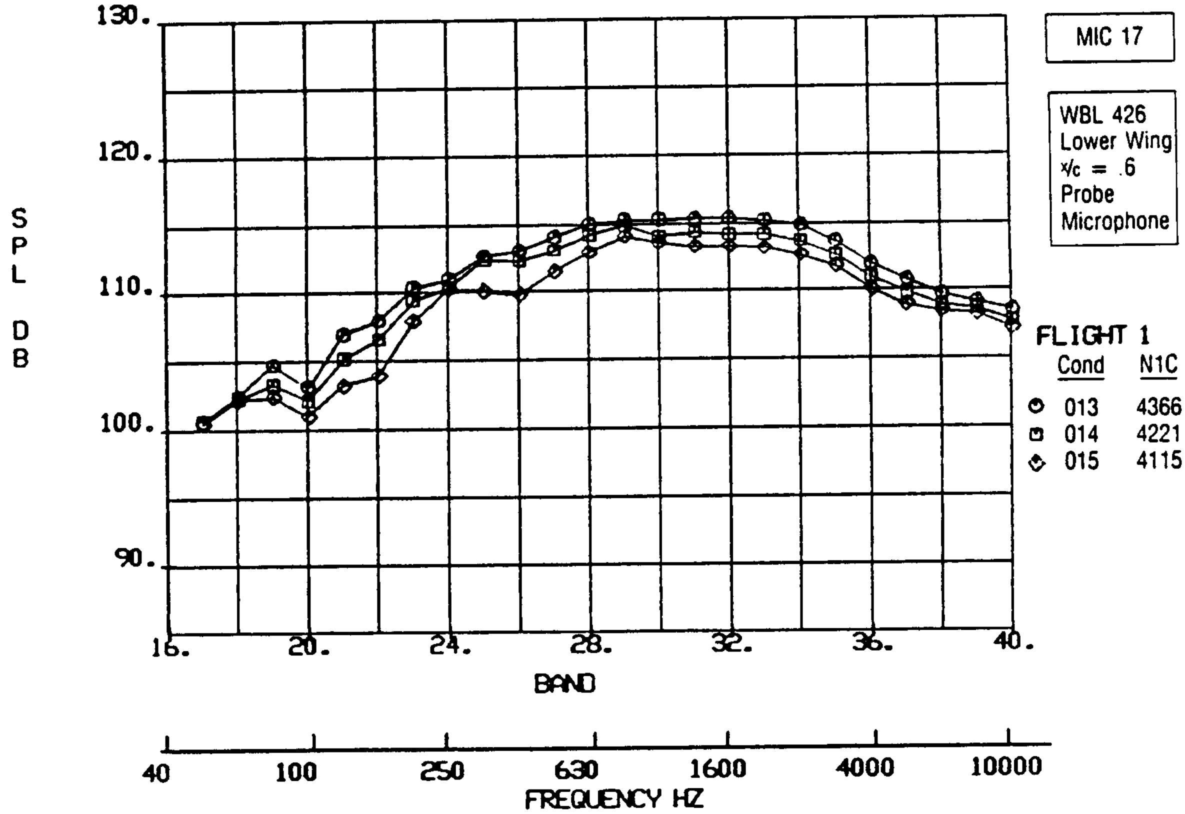


Figure 5-37. One-Third-Octave Band SPL vs Frequency, Flight 1, Category 6, Engine Power Variation

Table 5-12. Flight 2, Category 1, Altitude Variation—Zero Sideslip

Figures 5-38 through 5-46 present the one-third-octave band acoustic data for each microphone in Category 1 from Flight 2. Pertinent data corresponding to the Category 1, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
201	.80	30	3227	1.06	0
204	.81	34	3424	1.10	0
207	.81	36	3585	1.17	0
210	.80	37	3660	1.14	0
211	.80	38	3850	1.19	0
239	.80	38	3557	1.12	0
214	.81	39	3954	1.21	0
241	.80	41	4034	1.23	0

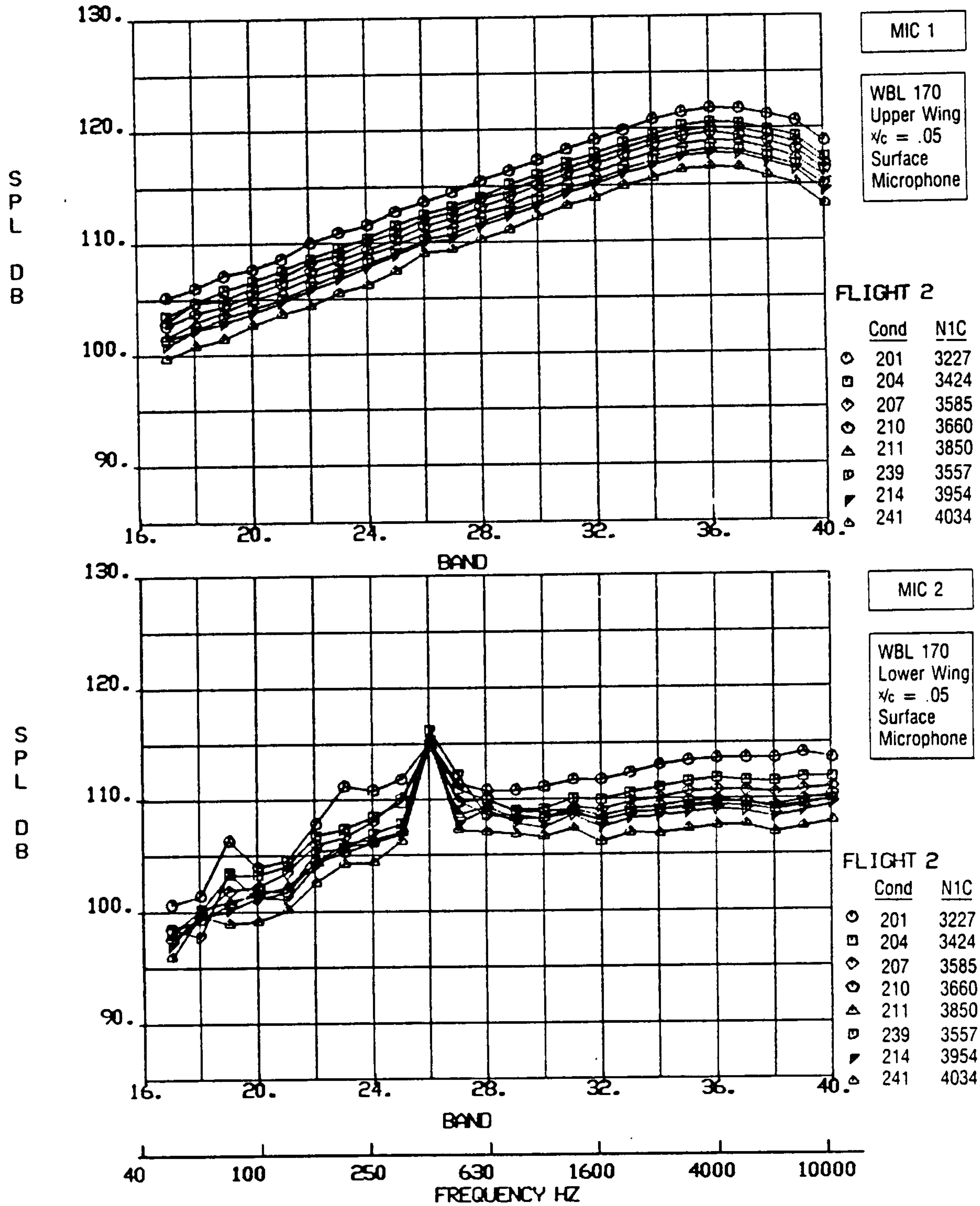


Figure 5-38. One-Third-Octave BAnd SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

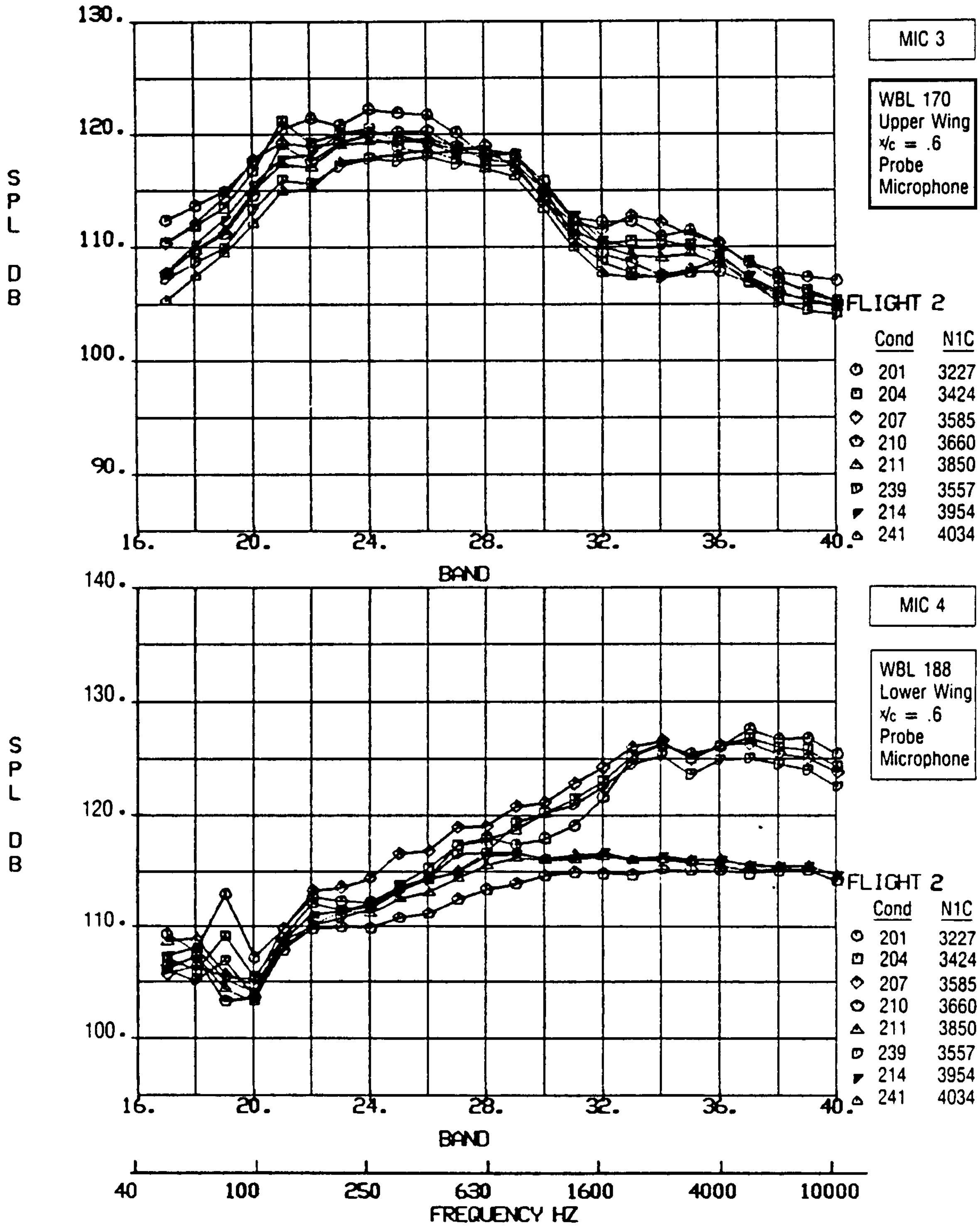


Figure 5-39. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

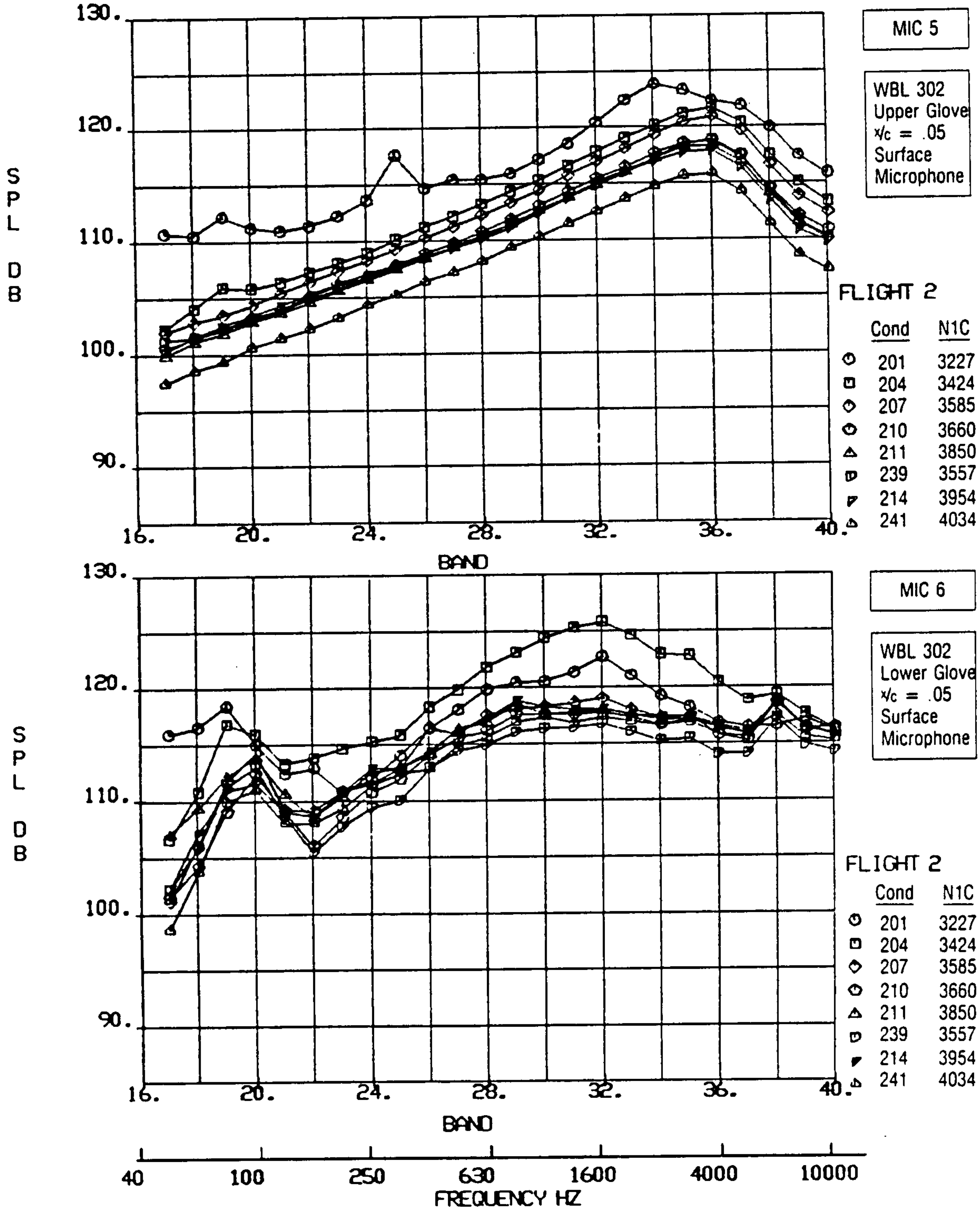


Figure 5-40. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

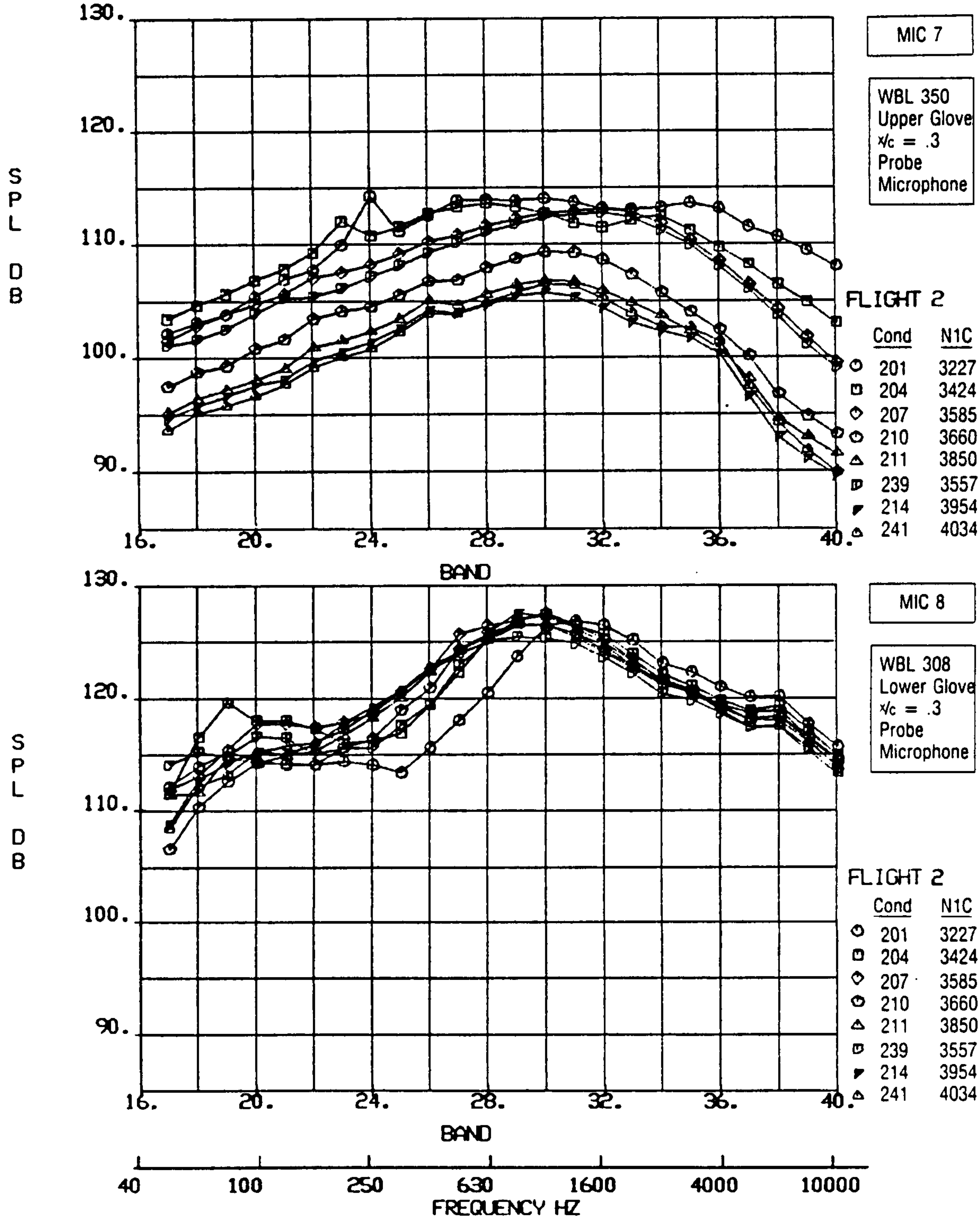


Figure 5-41. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

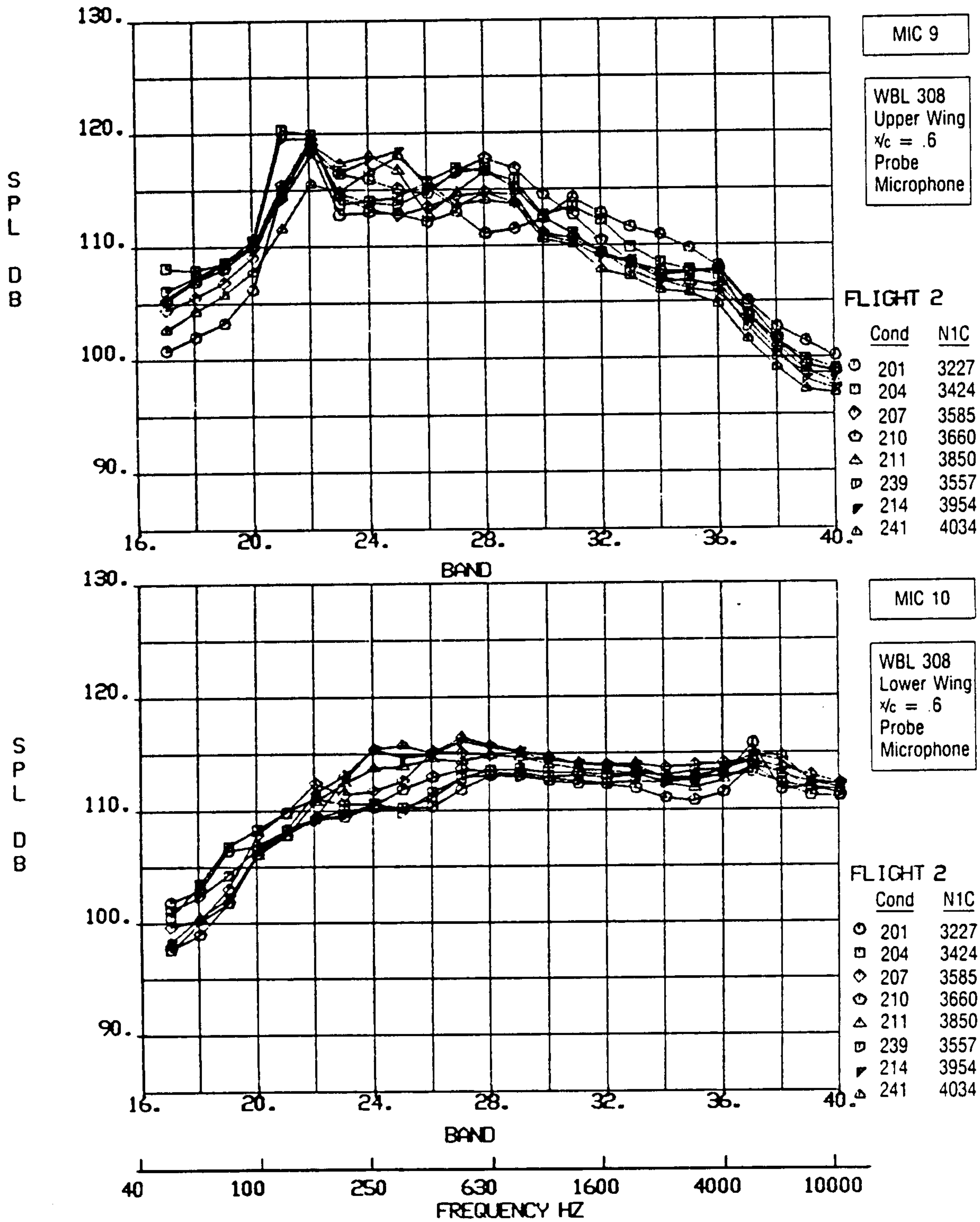


Figure 5-42. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

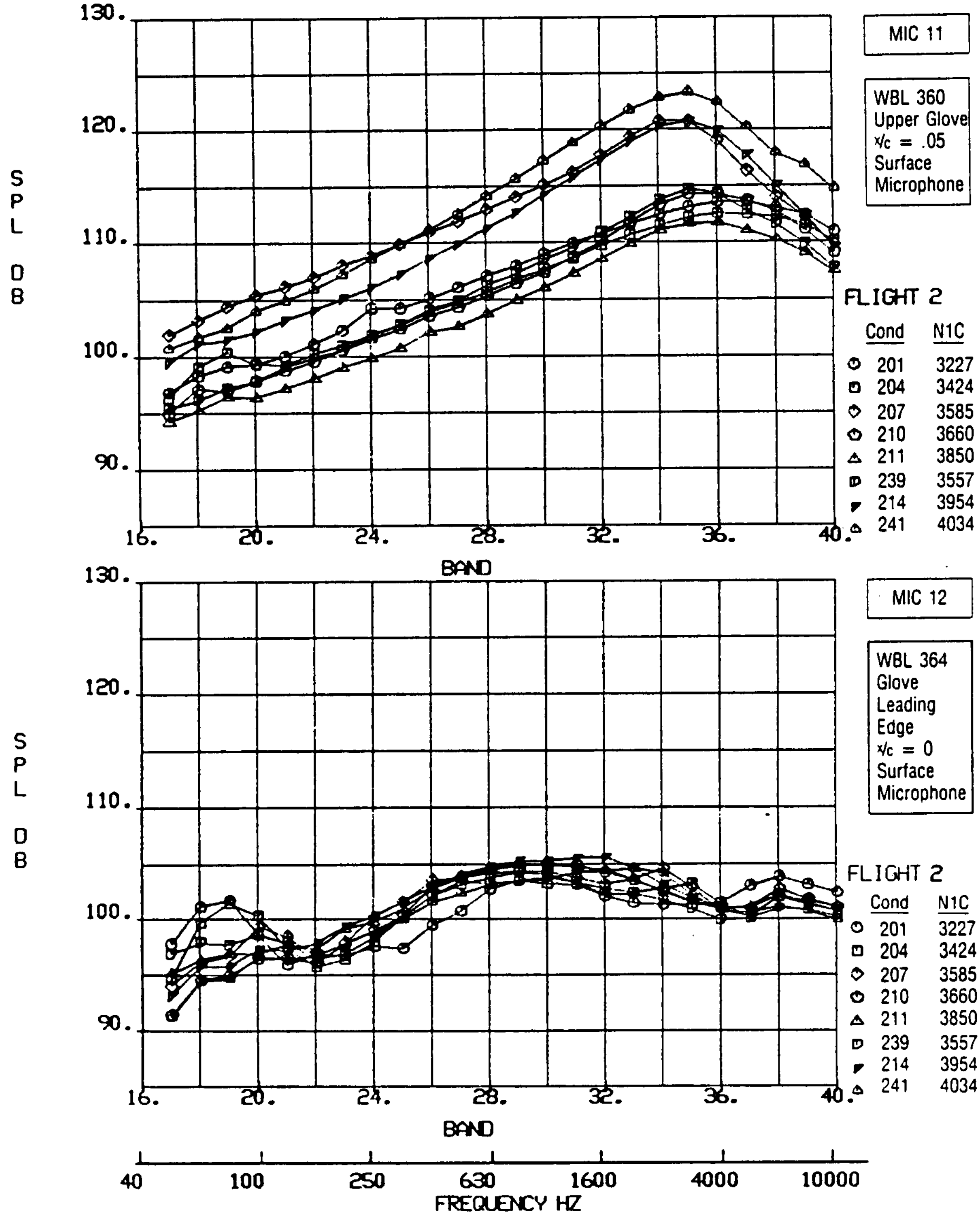


Figure 5-43. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

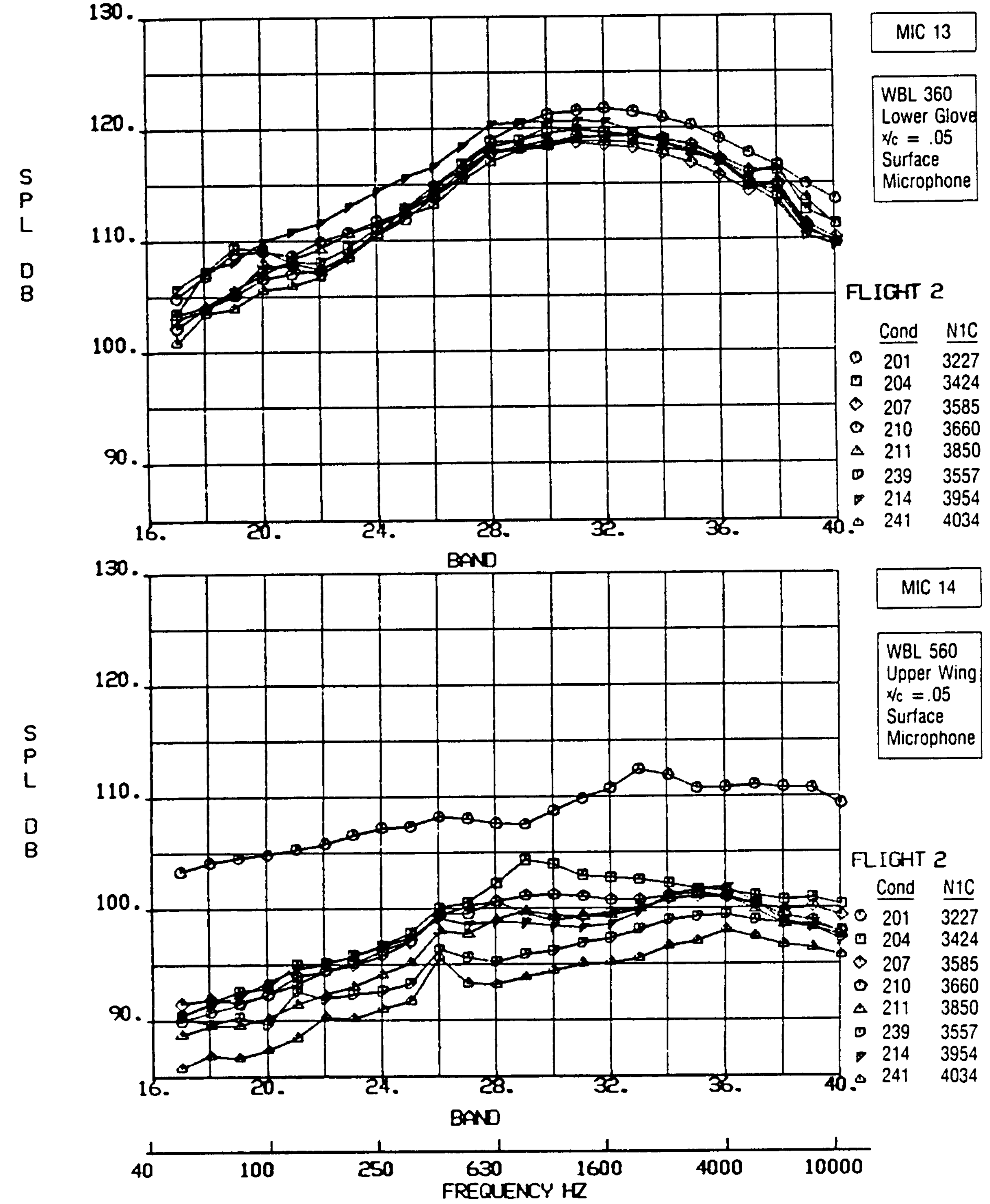


Figure 5-44. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

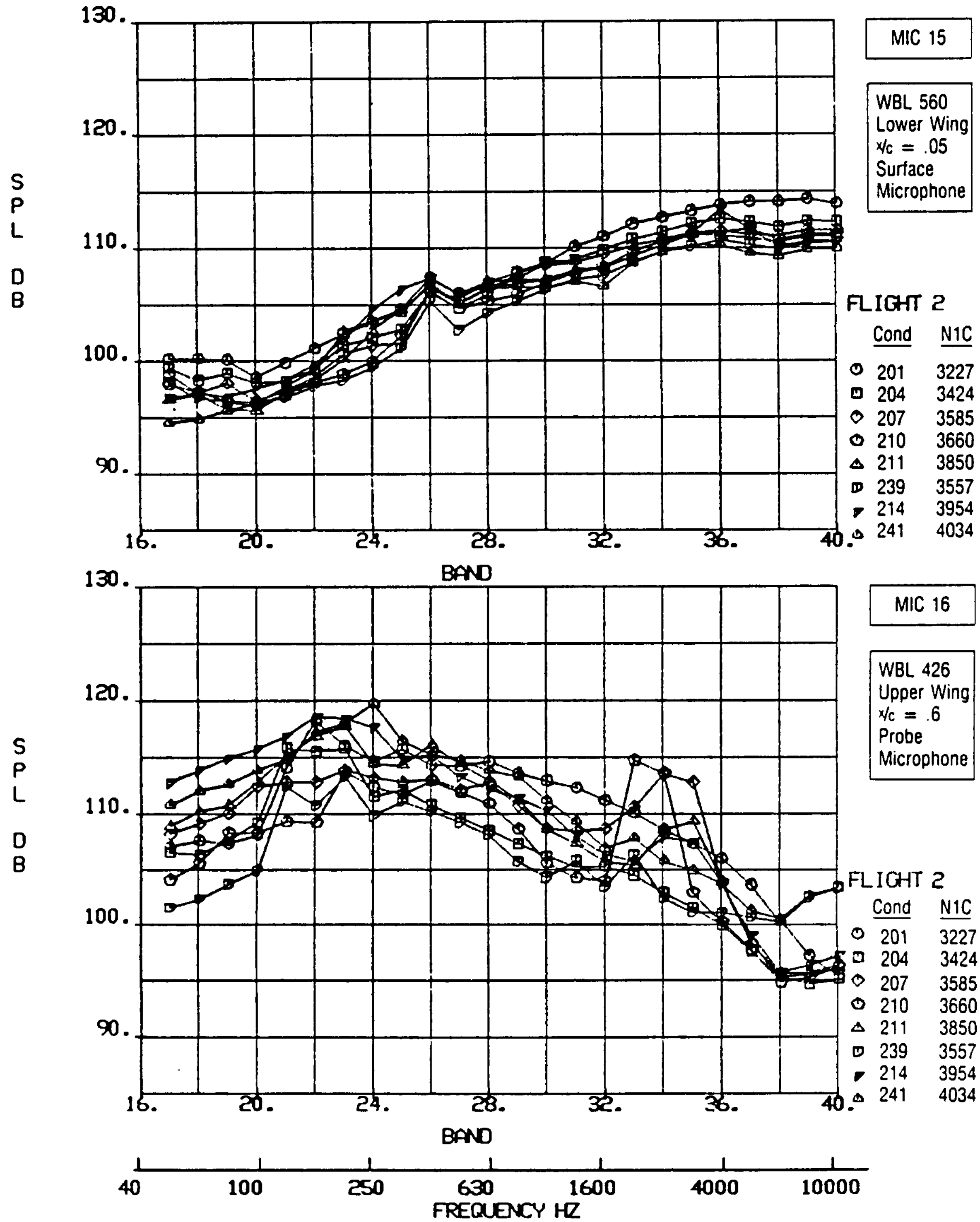


Figure 5-45. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

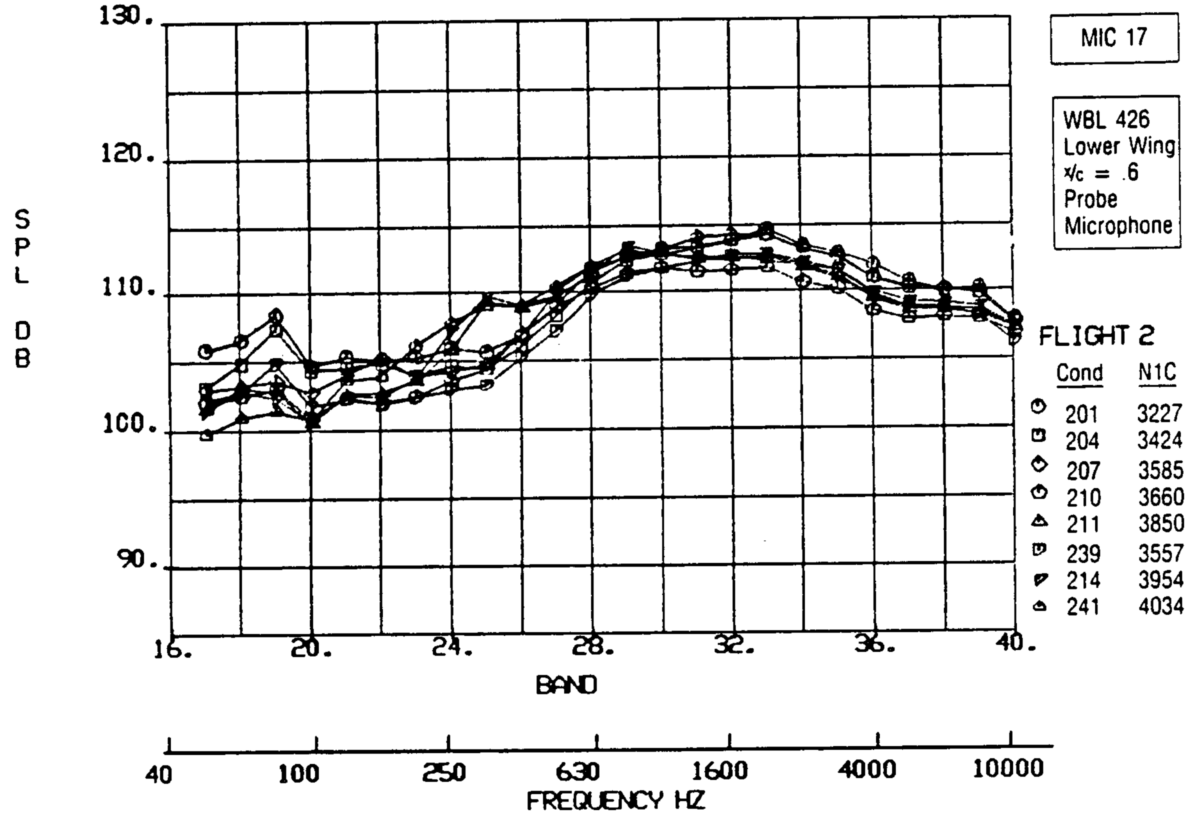


Figure 5-46. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 1, Altitude Variation—Zero Sideslip

Table 5-13. Flight 2, Category 2, Positive Sideslip

Figures 5-47 through 5-55 present the one-third-octave band acoustic data for each microphone in Category 2 from Flight 2. Pertinent data corresponding to the Category 2, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
202	.79	30	3240	1.05	3.2
205	.79	34	3437	1.09	3.9
212	.79	38	3867	1.18	3.9

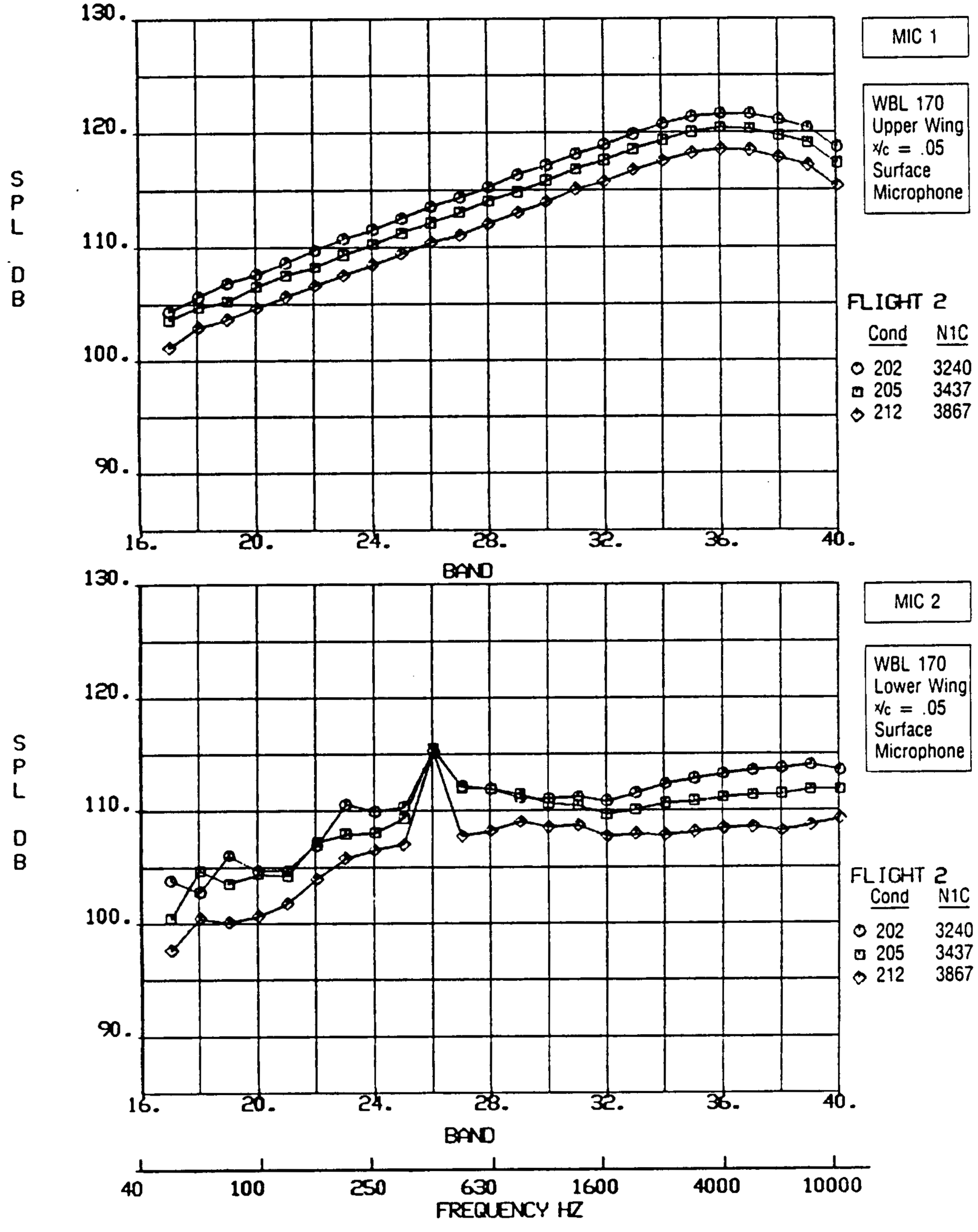


Figure 5-47. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

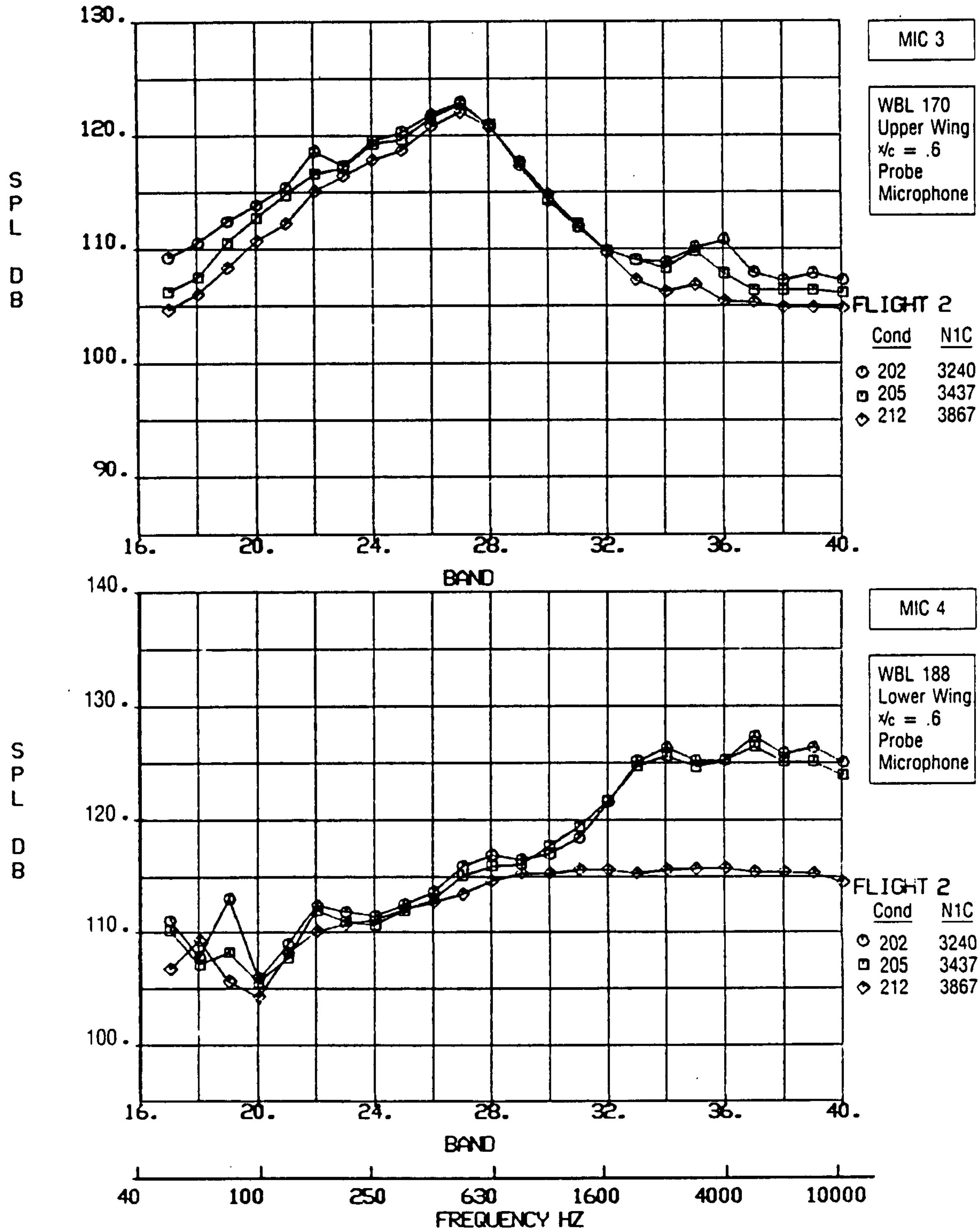


Figure 5-48. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

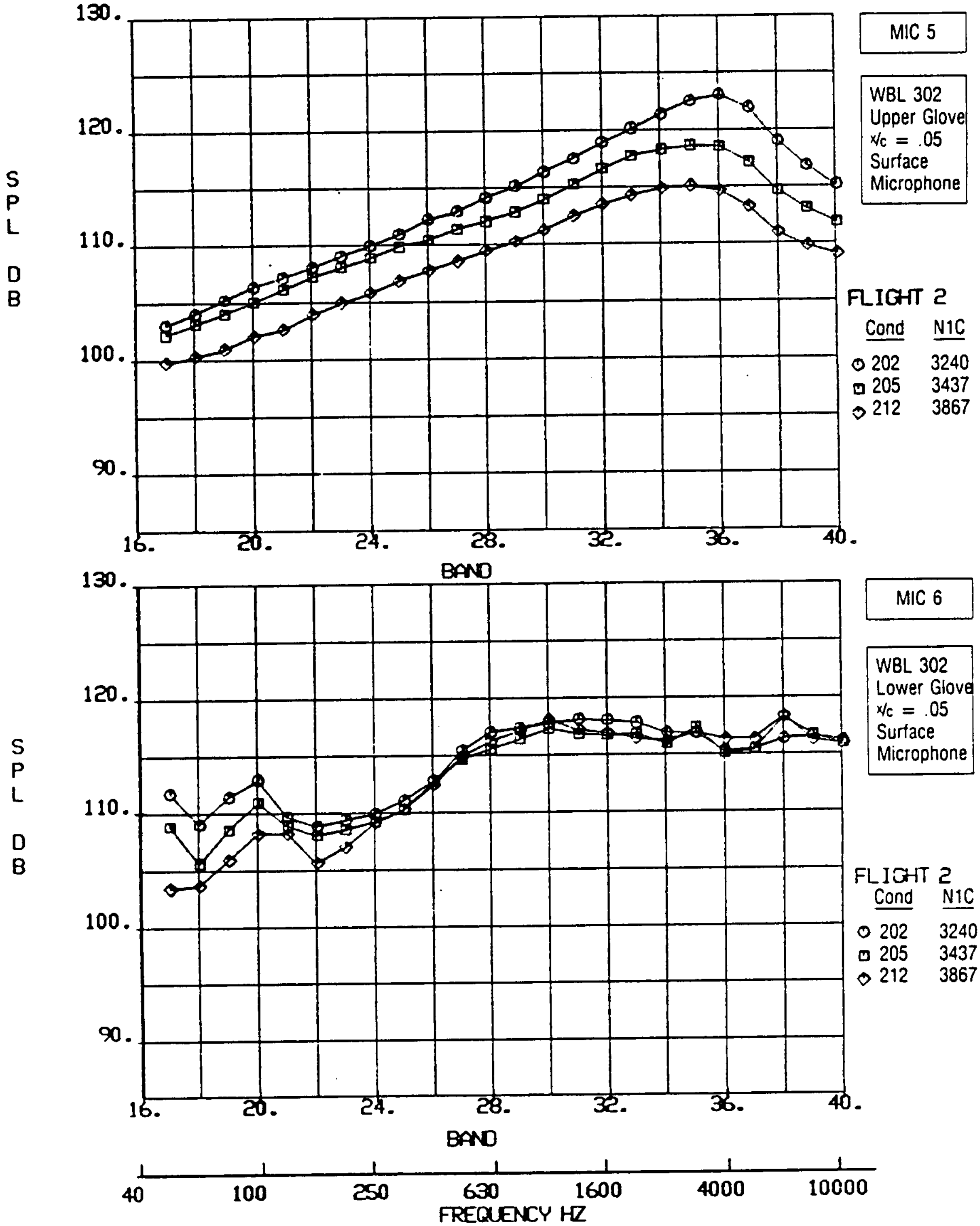


Figure 5-49. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

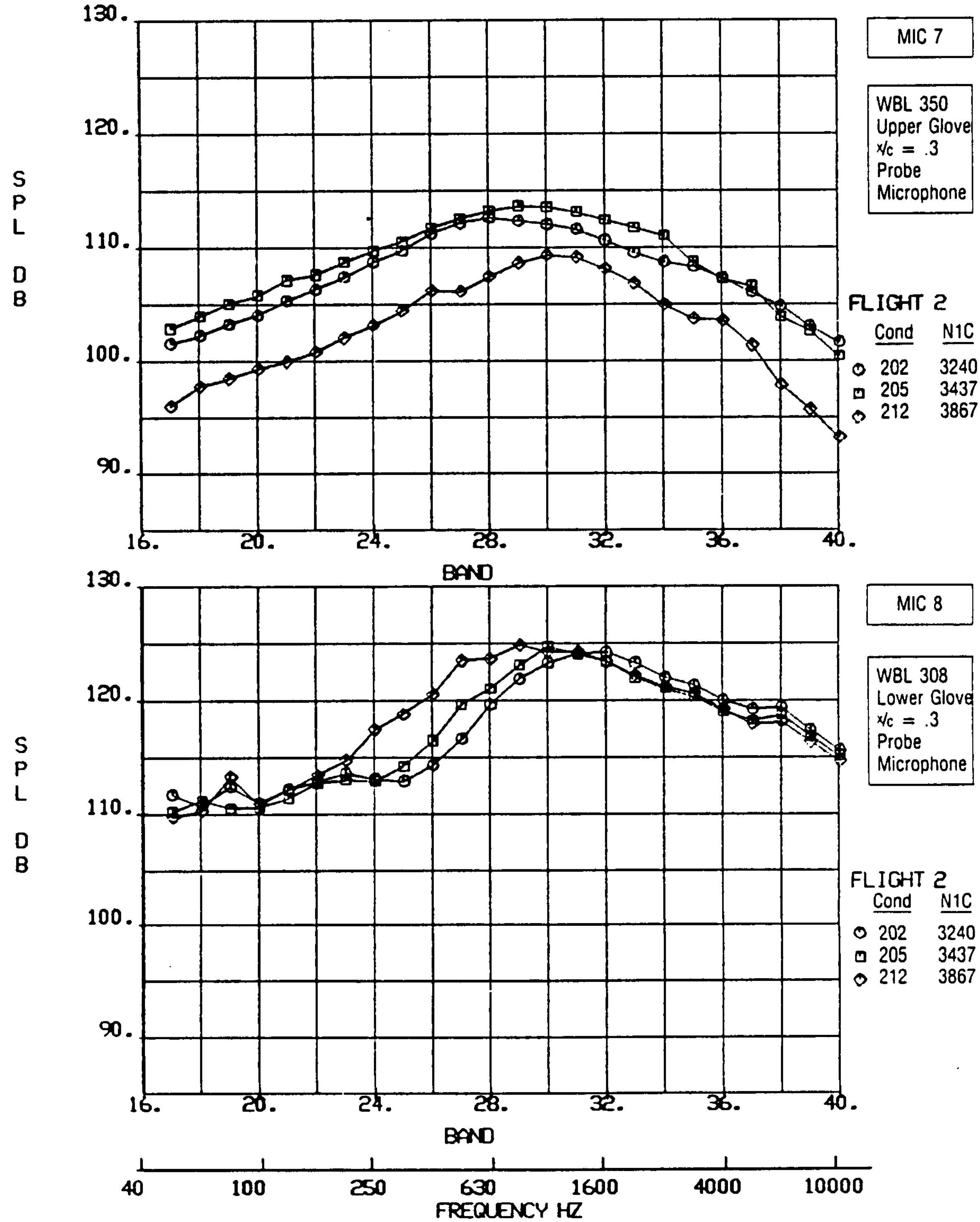


Figure 5-50. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

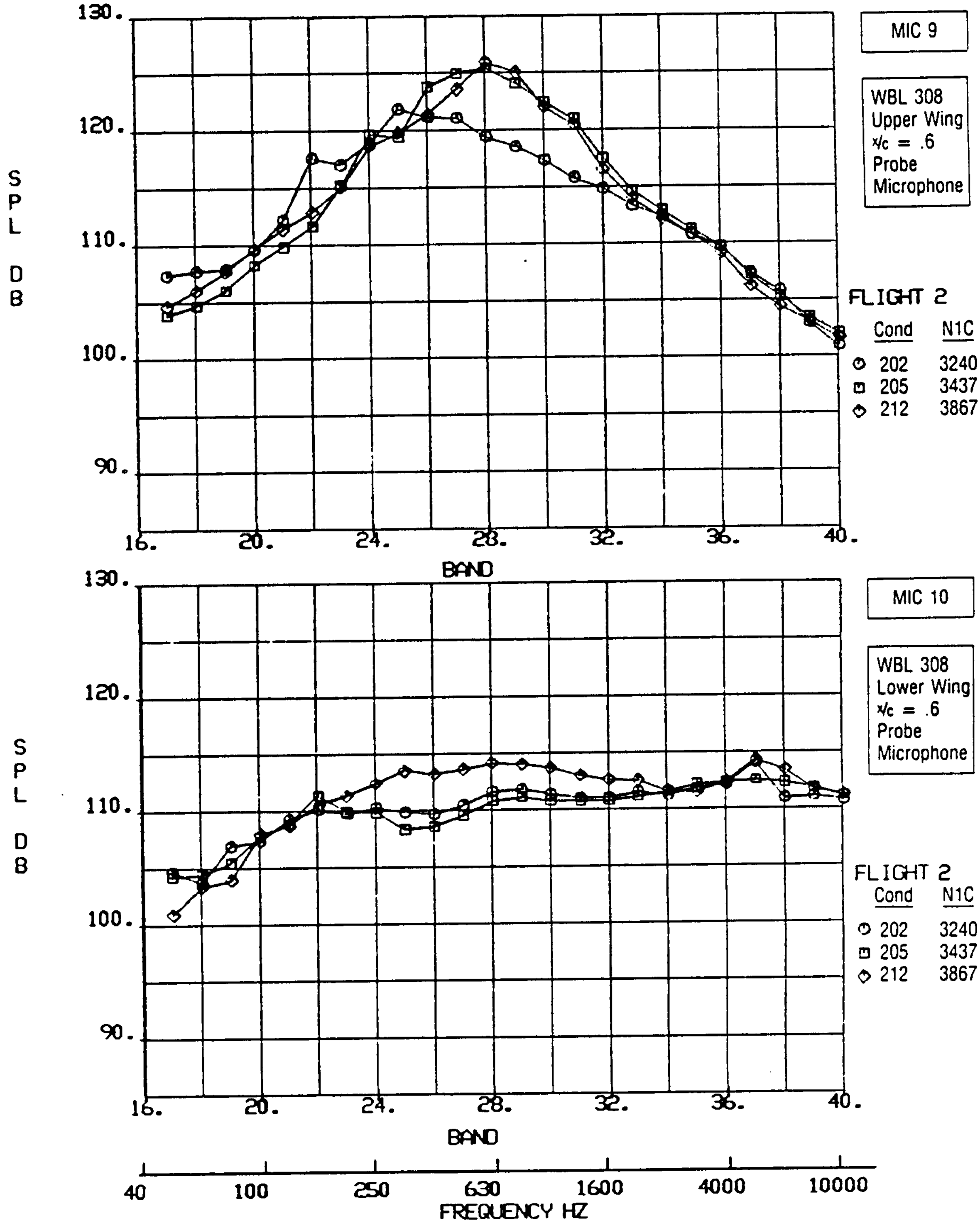


Figure 5-51. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

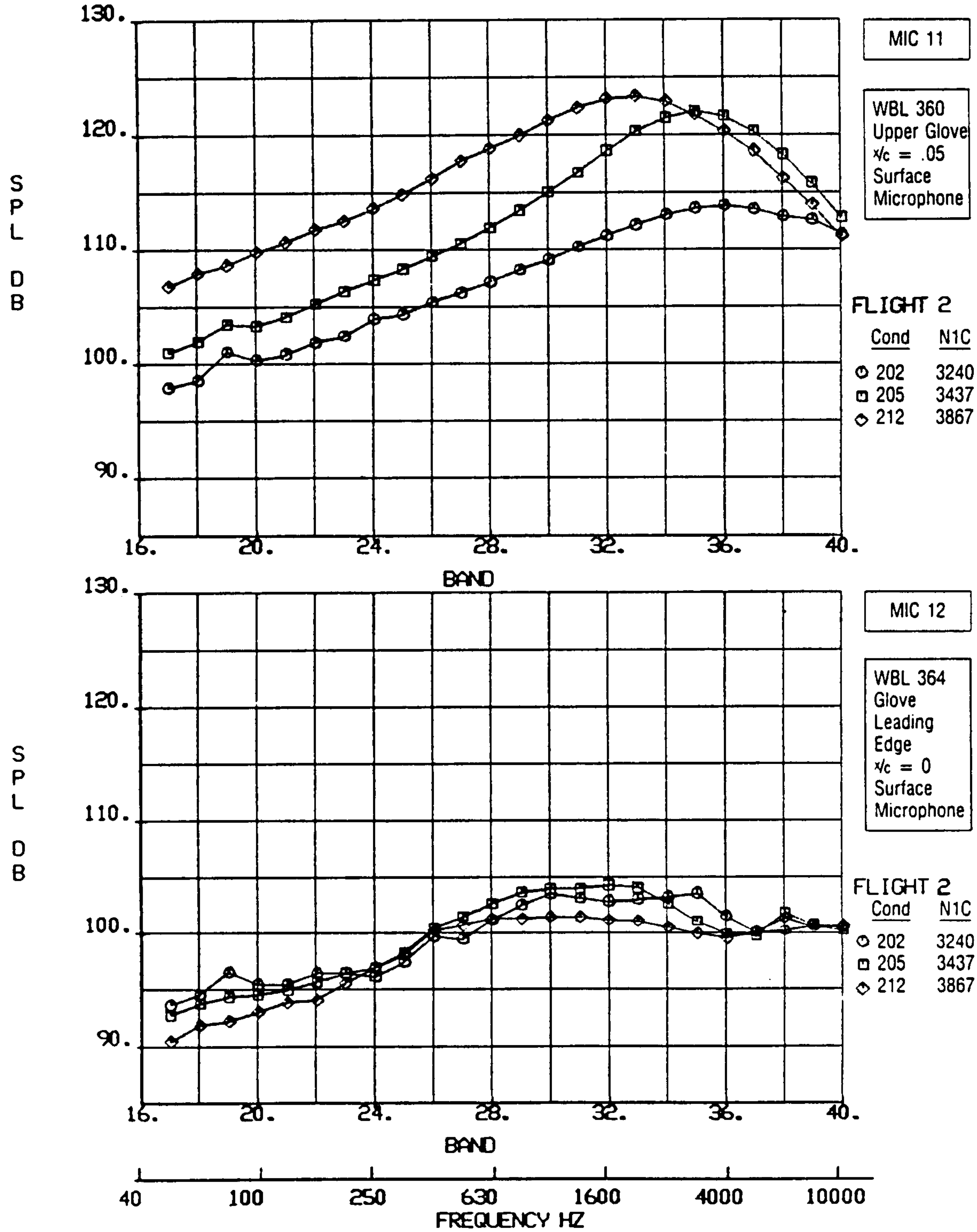


Figure 5-52. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

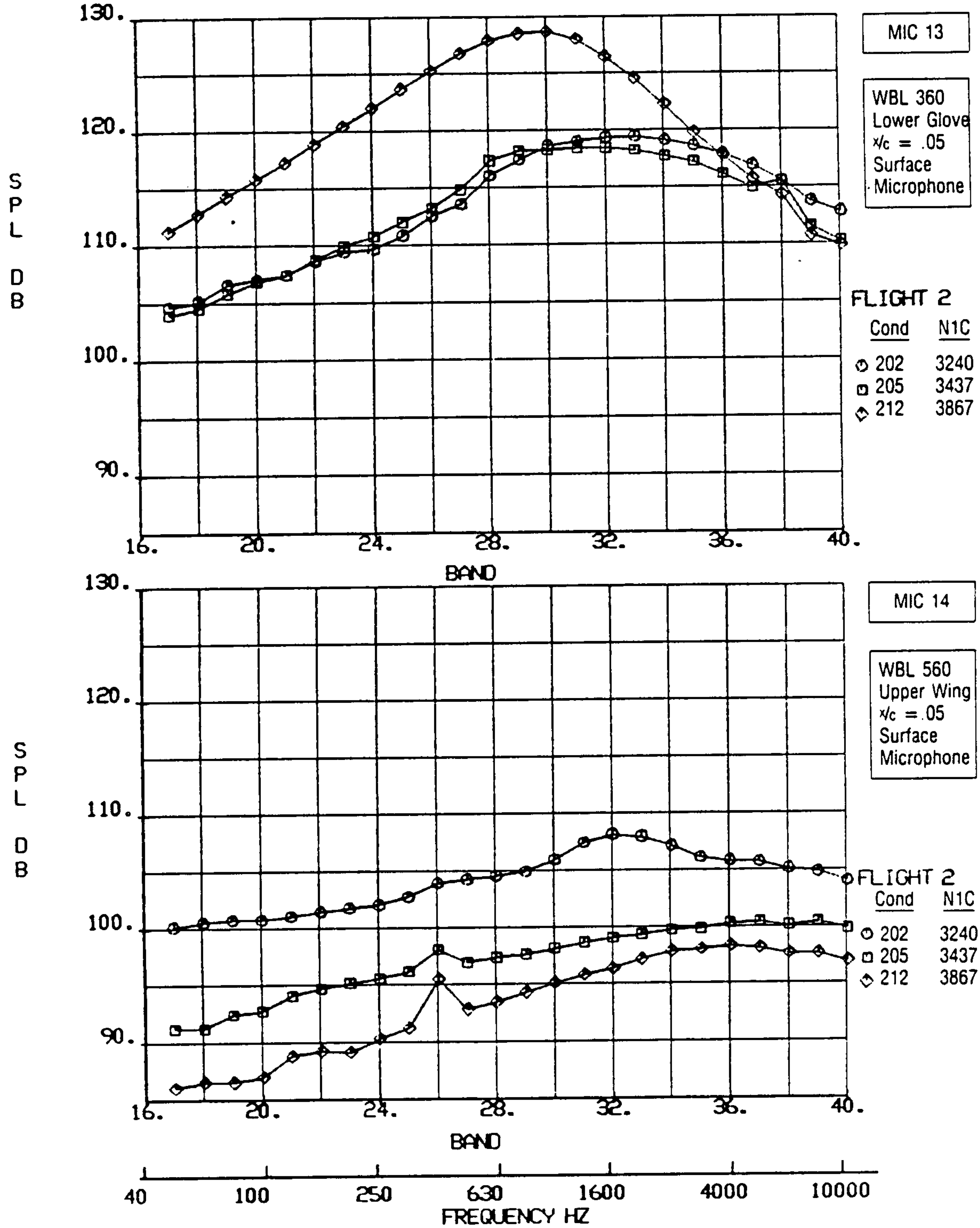


Figure 5-53. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

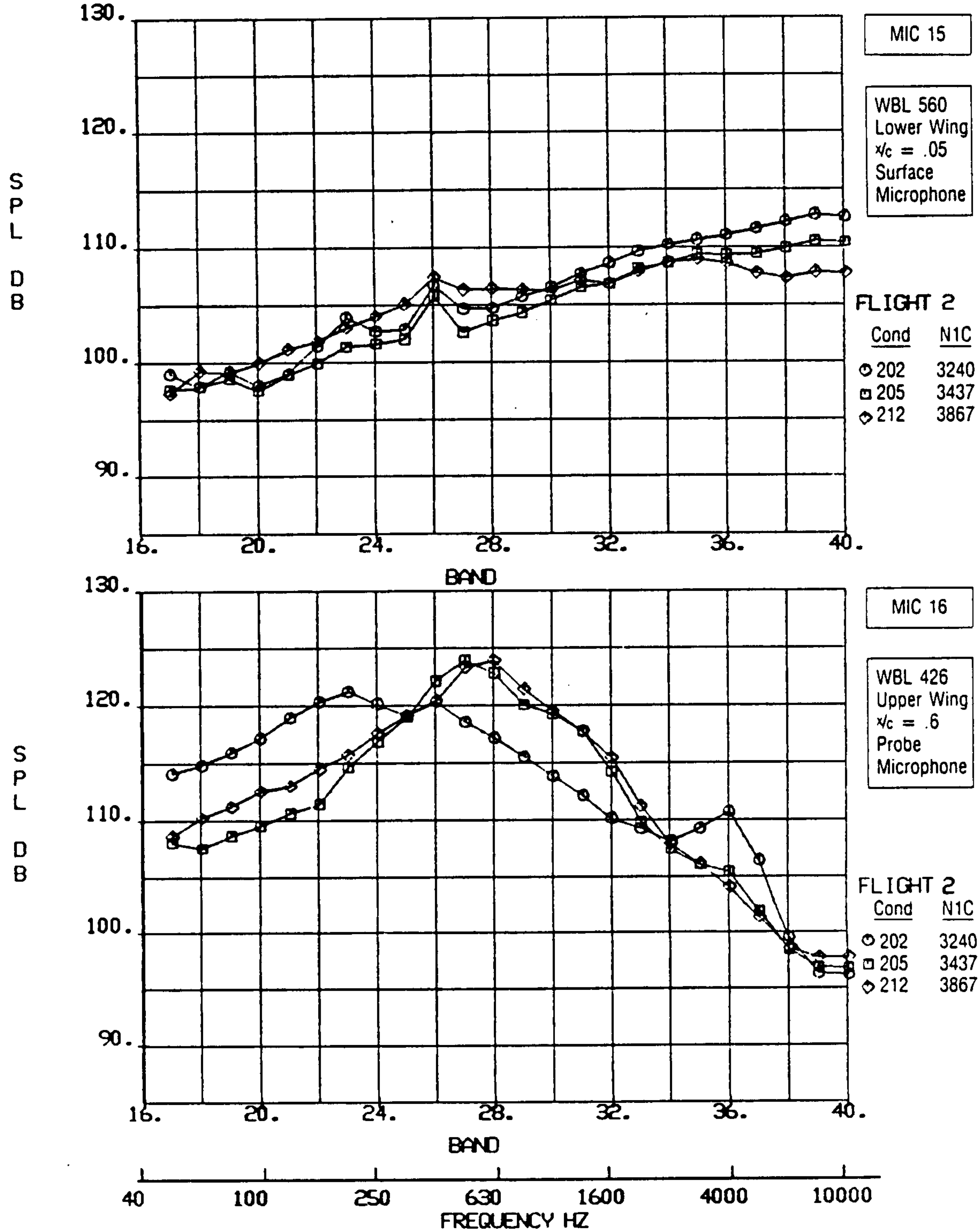


Figure 5-54. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

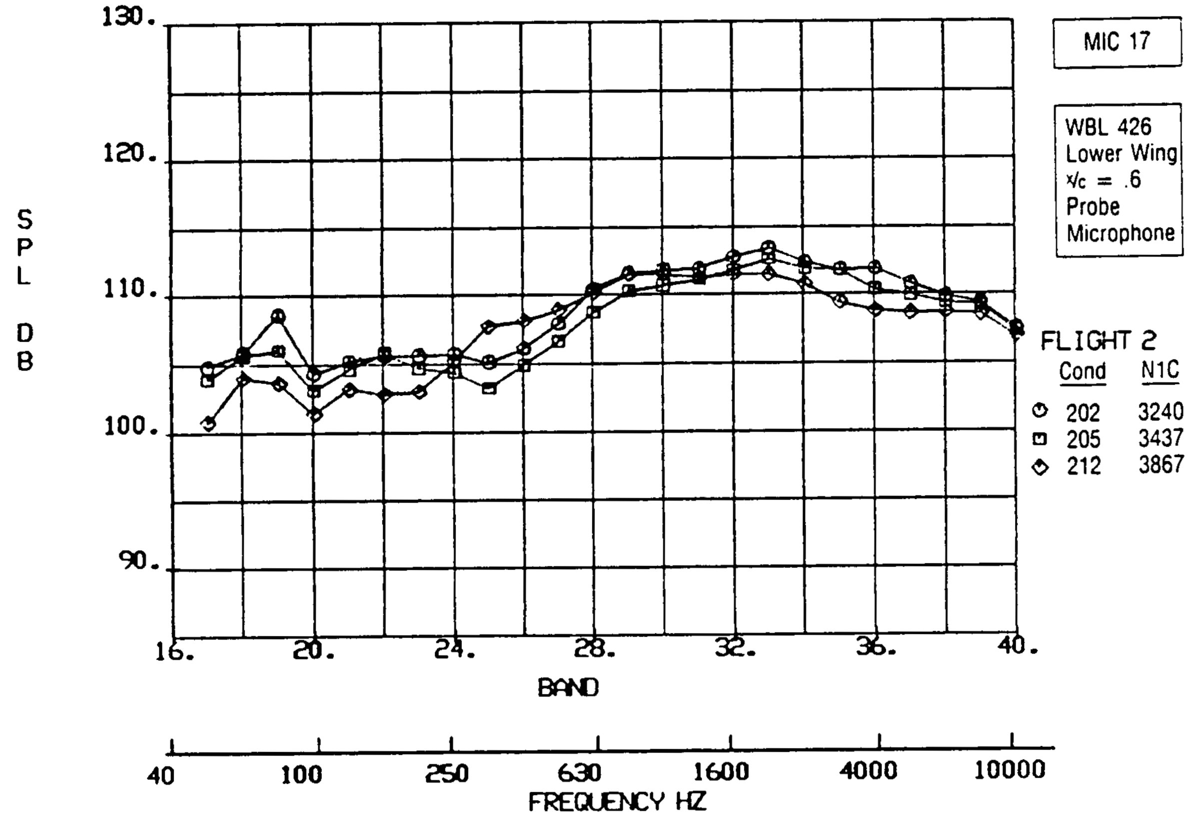


Figure 5-55. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 2, Positive Sideslip

Table 5-14. Flight 2, Category 3, Negative Sideslip

Figures 5-56 through 5-64 present the one-third-octave band acoustic data for each microphone in Category 3 from Flight 2. Pertinent data corresponding to the Category 3, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
203	.79	30	3294	1.07	-4.0
206	.80	34	3481	1.11	-3.9
213	.80	38	3796	1.17	-3.7

C-2

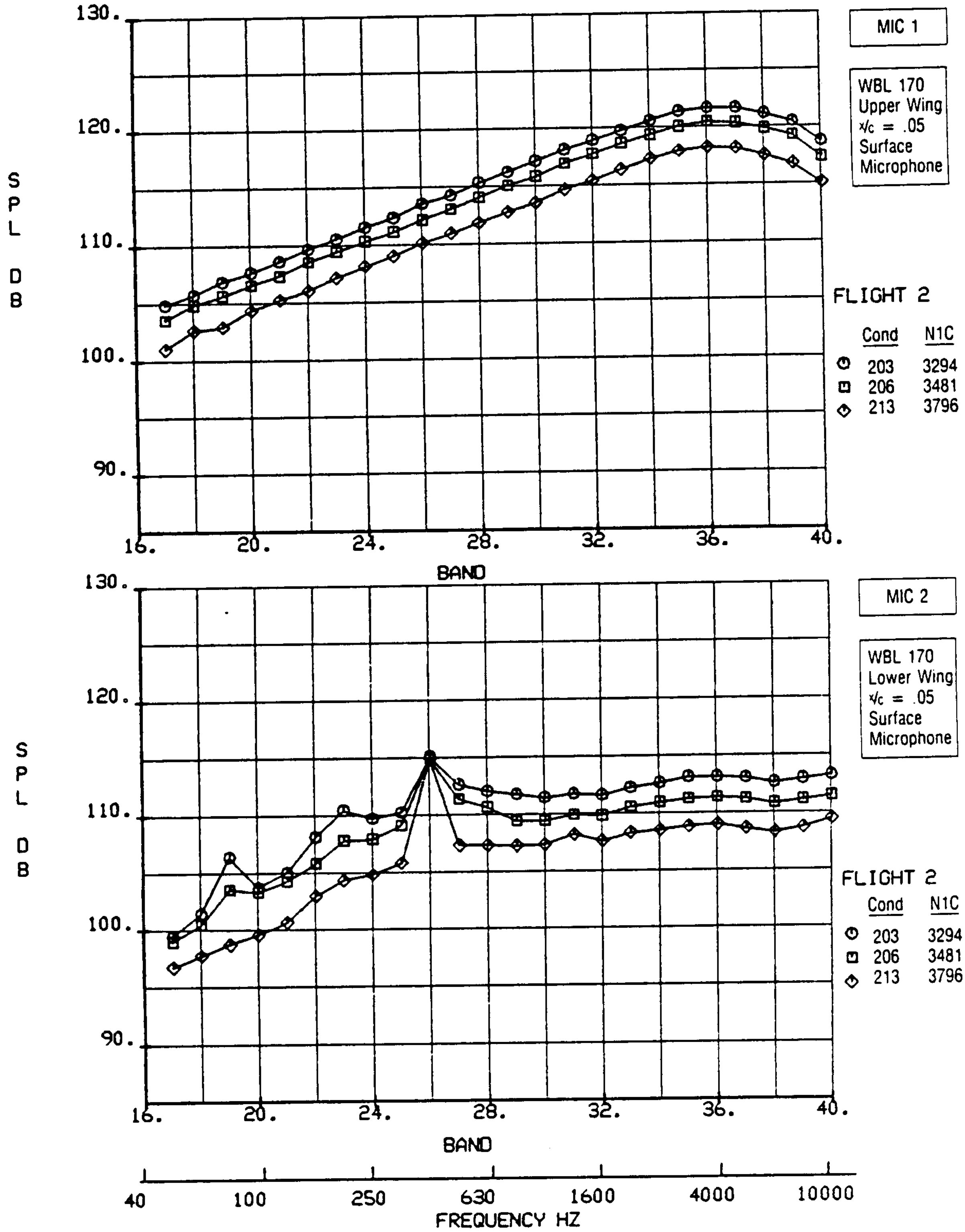


Figure 5-56. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

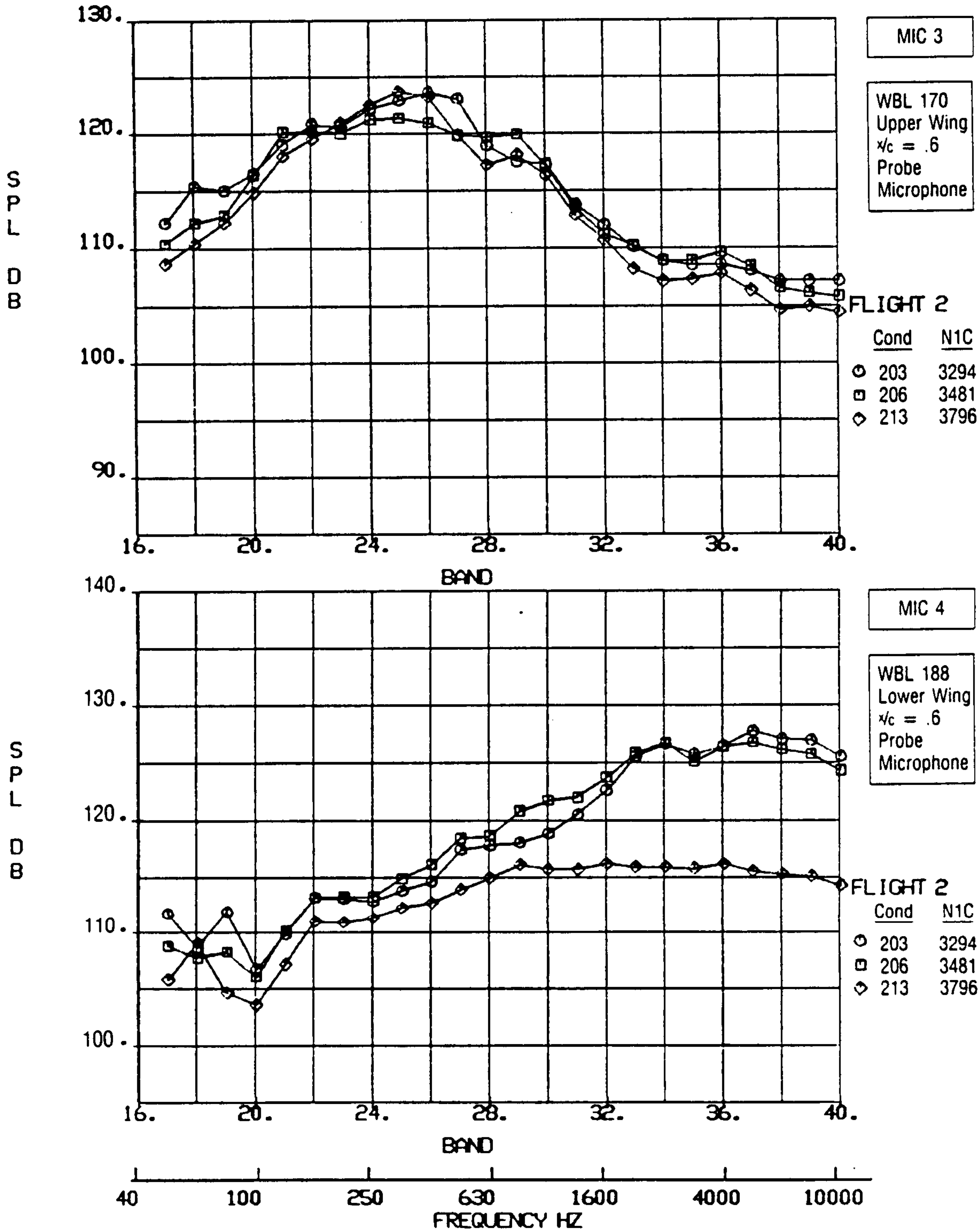


Figure 5-57. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

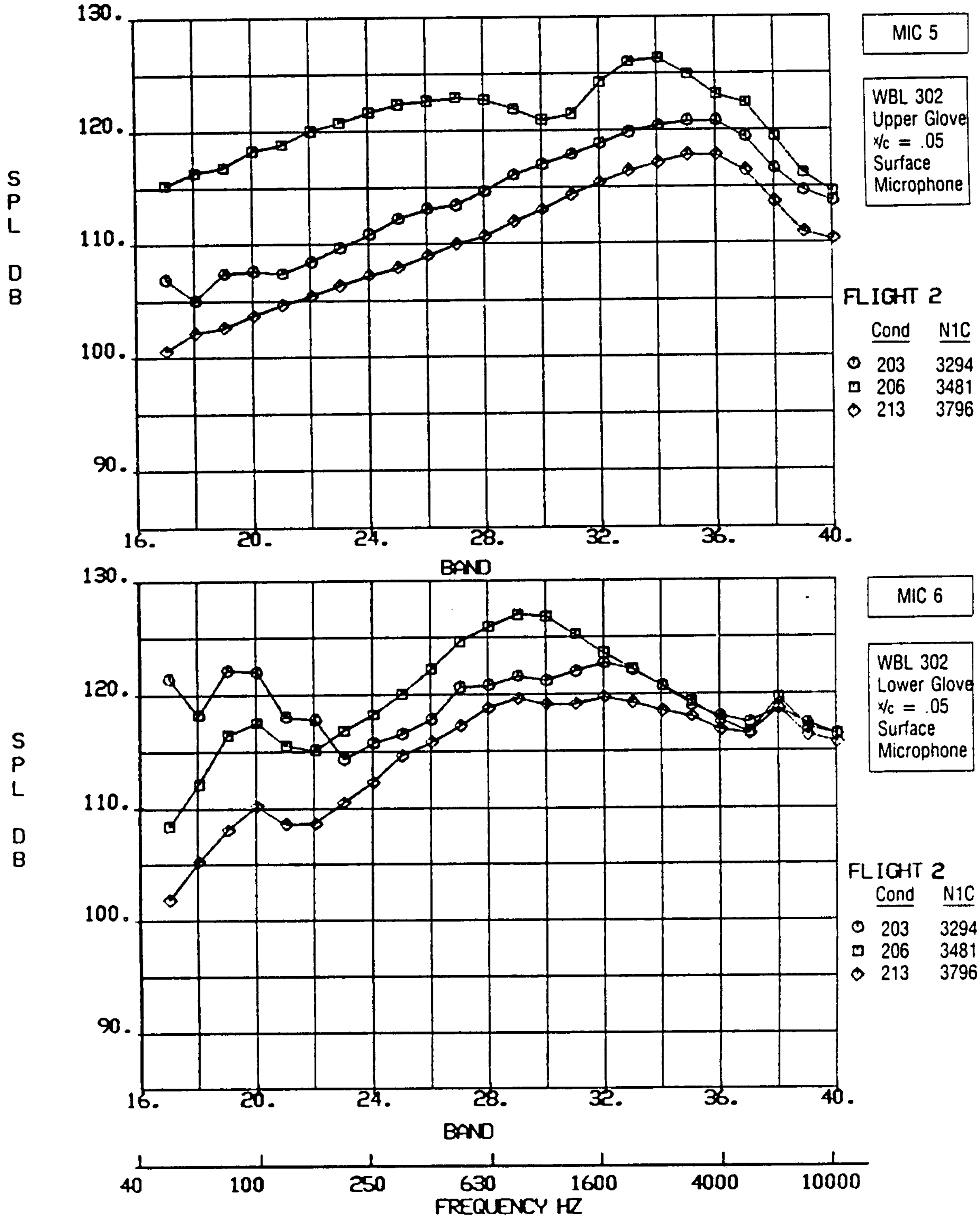


Figure 5-58. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

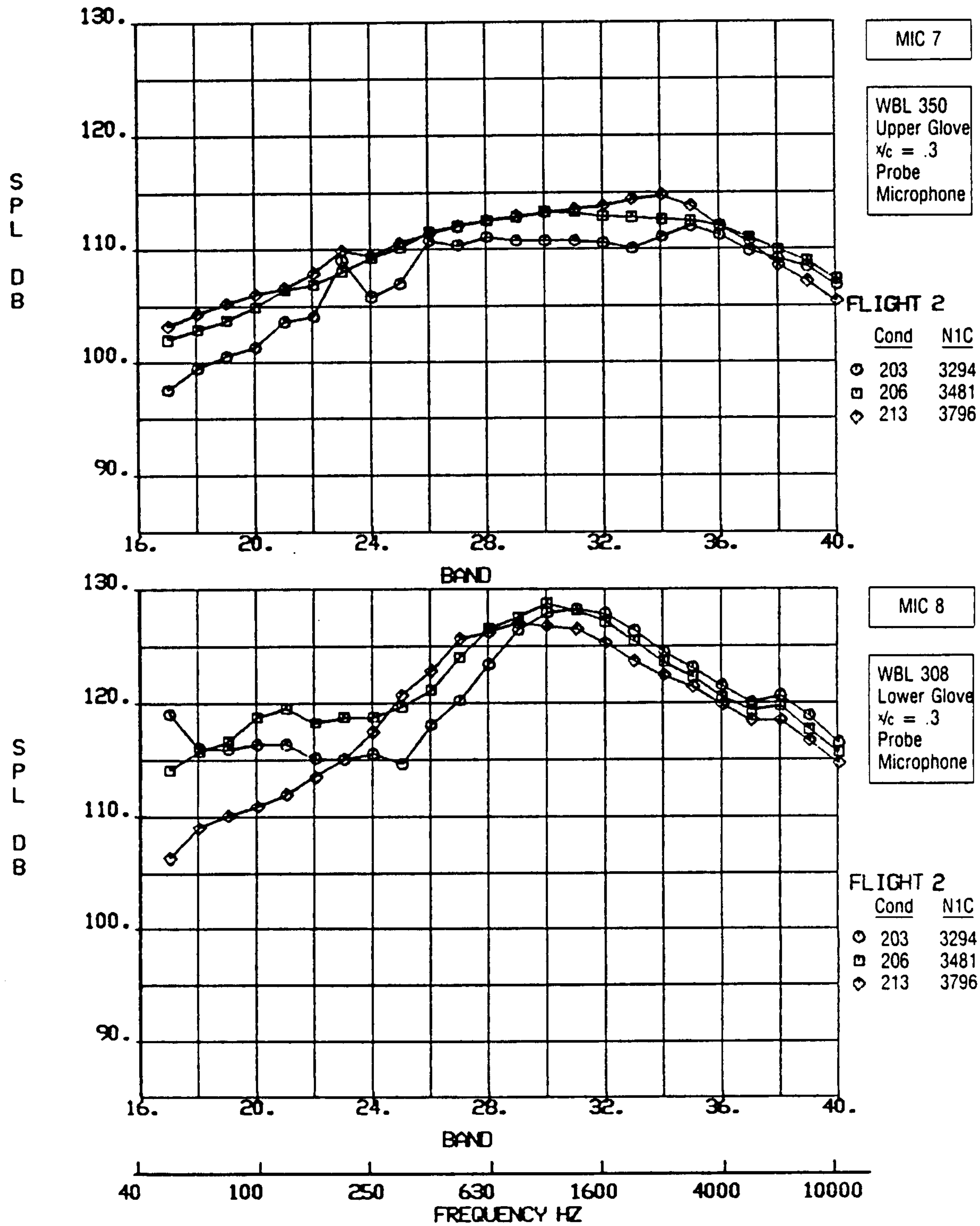


Figure 5-59. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

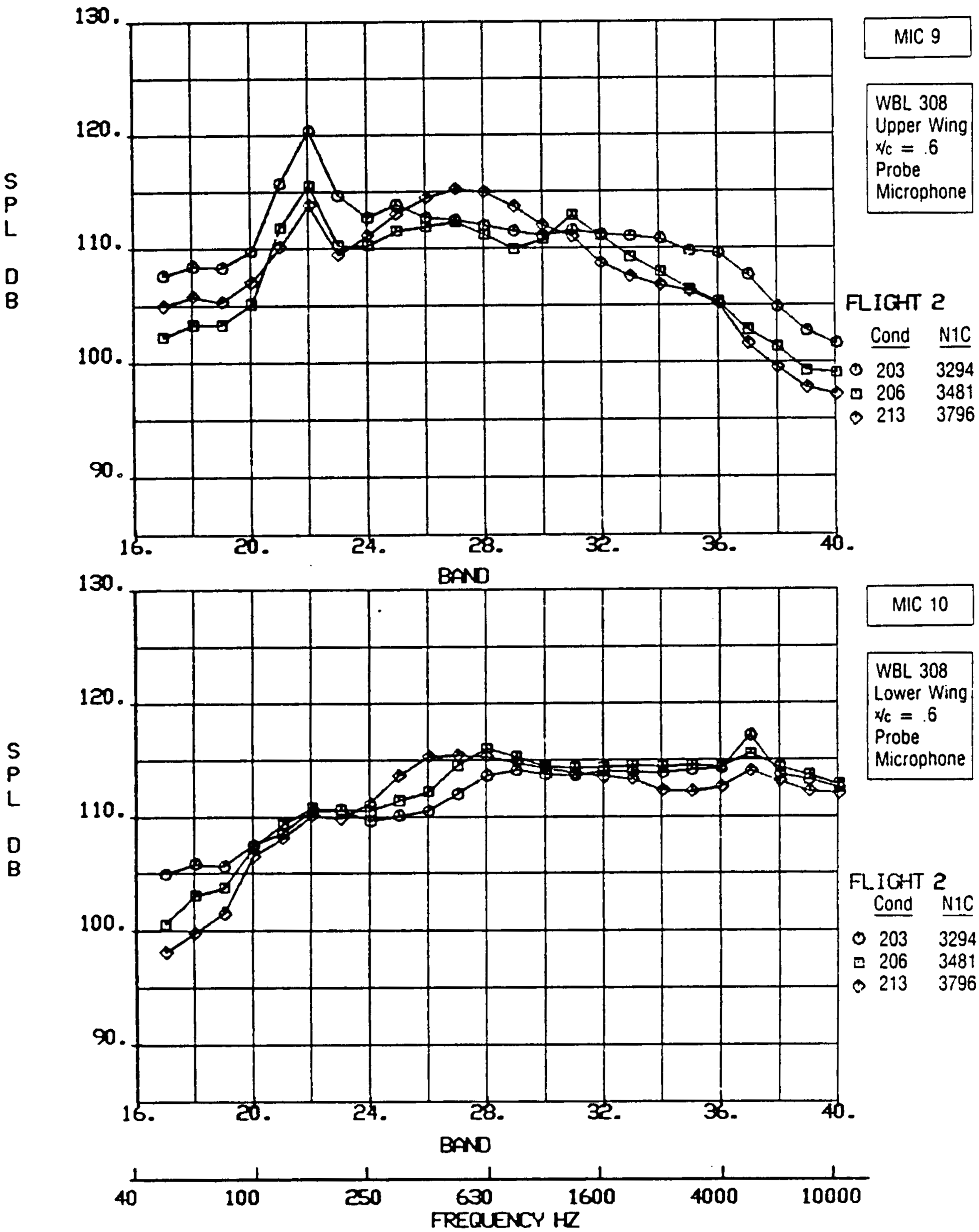


Figure 5-60. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

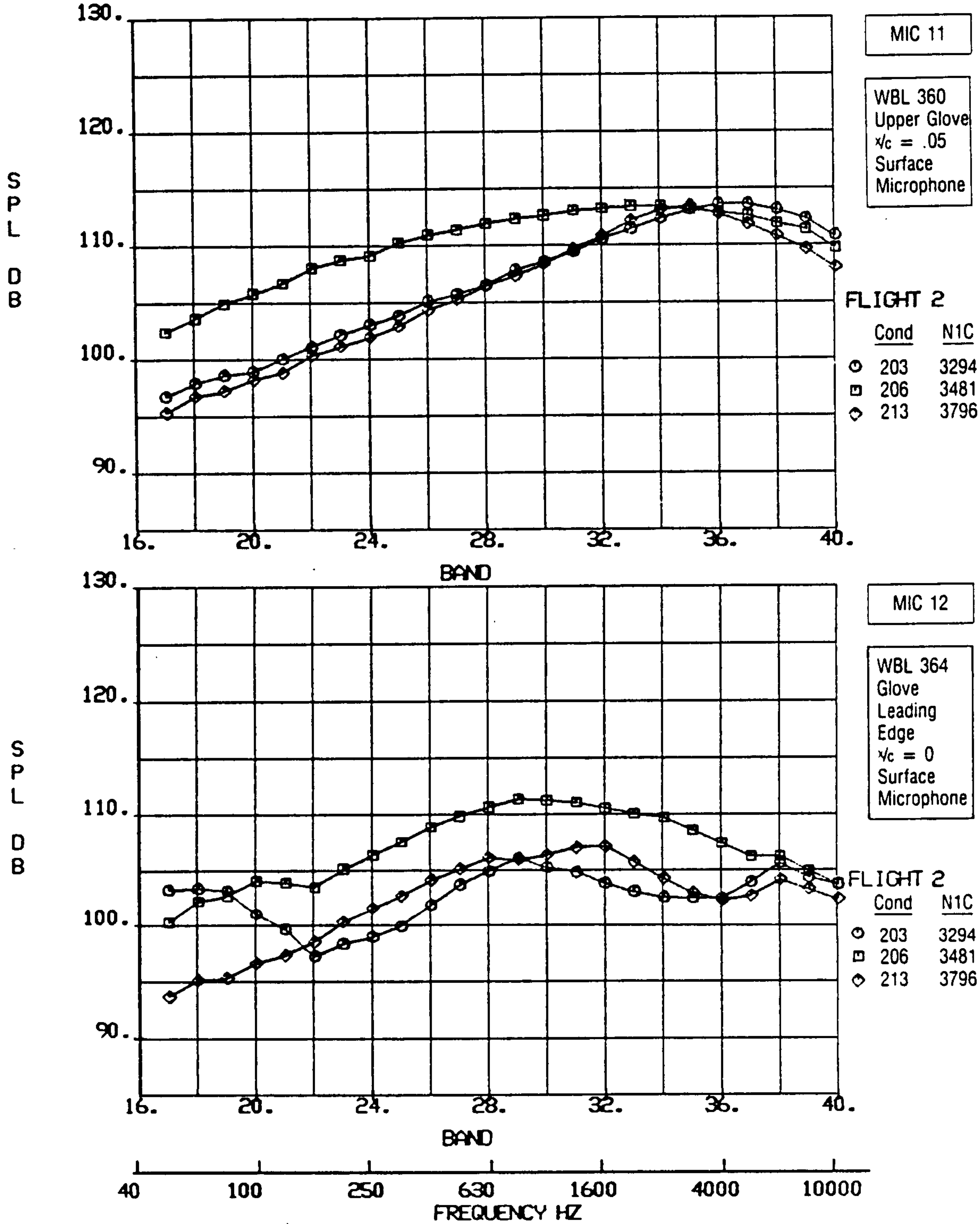


Figure 5-61. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

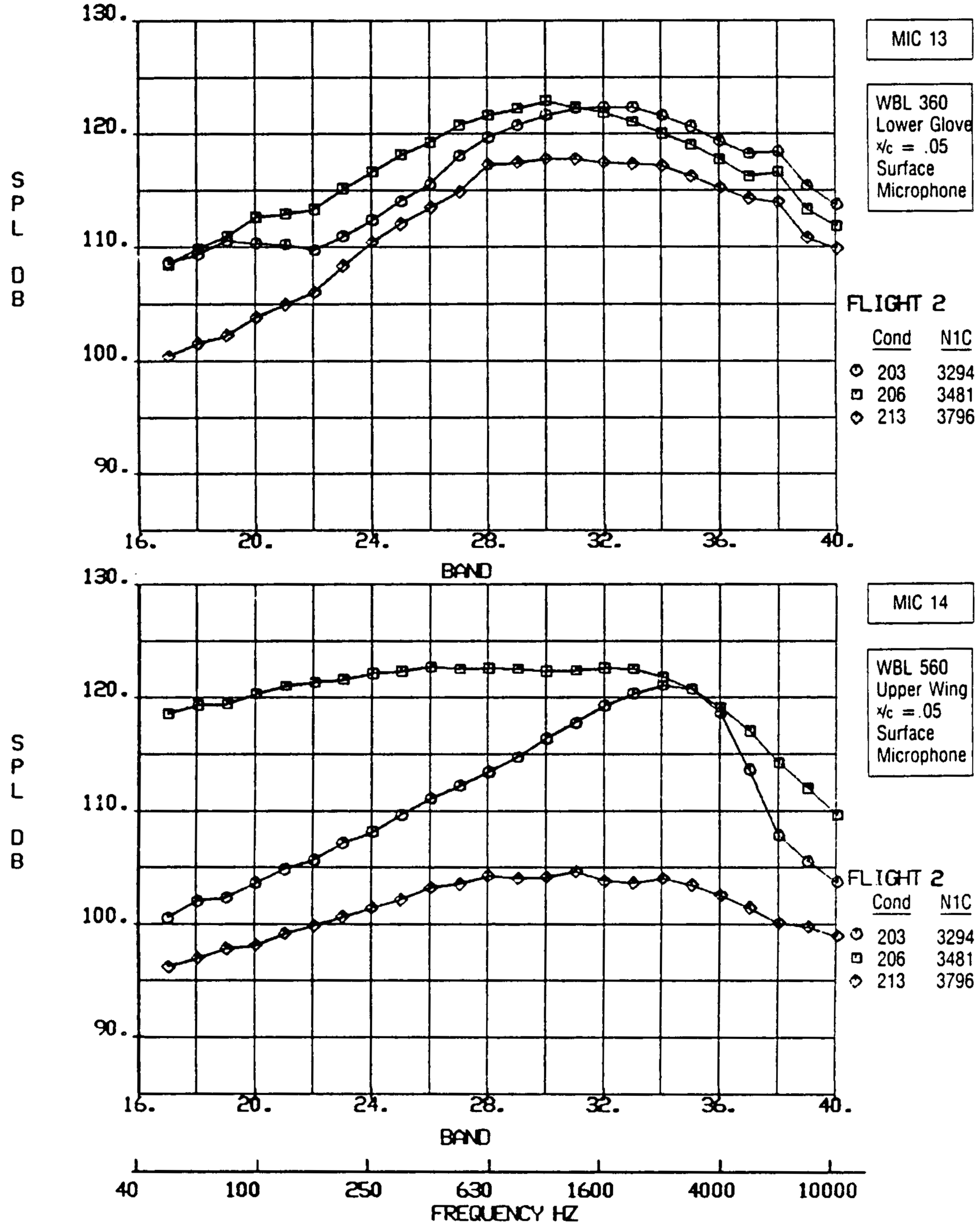


Figure 5-62. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

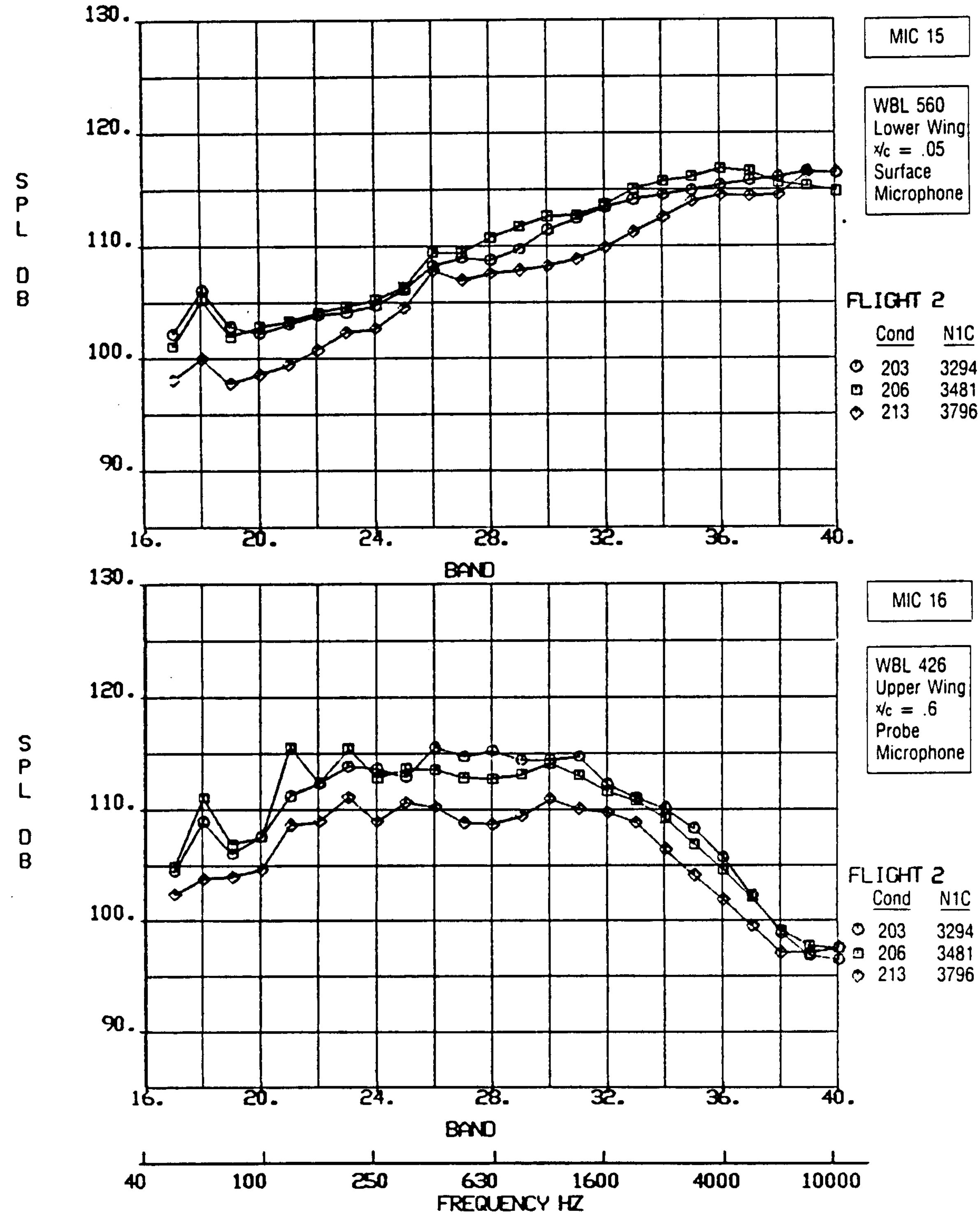


Figure 5-63. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

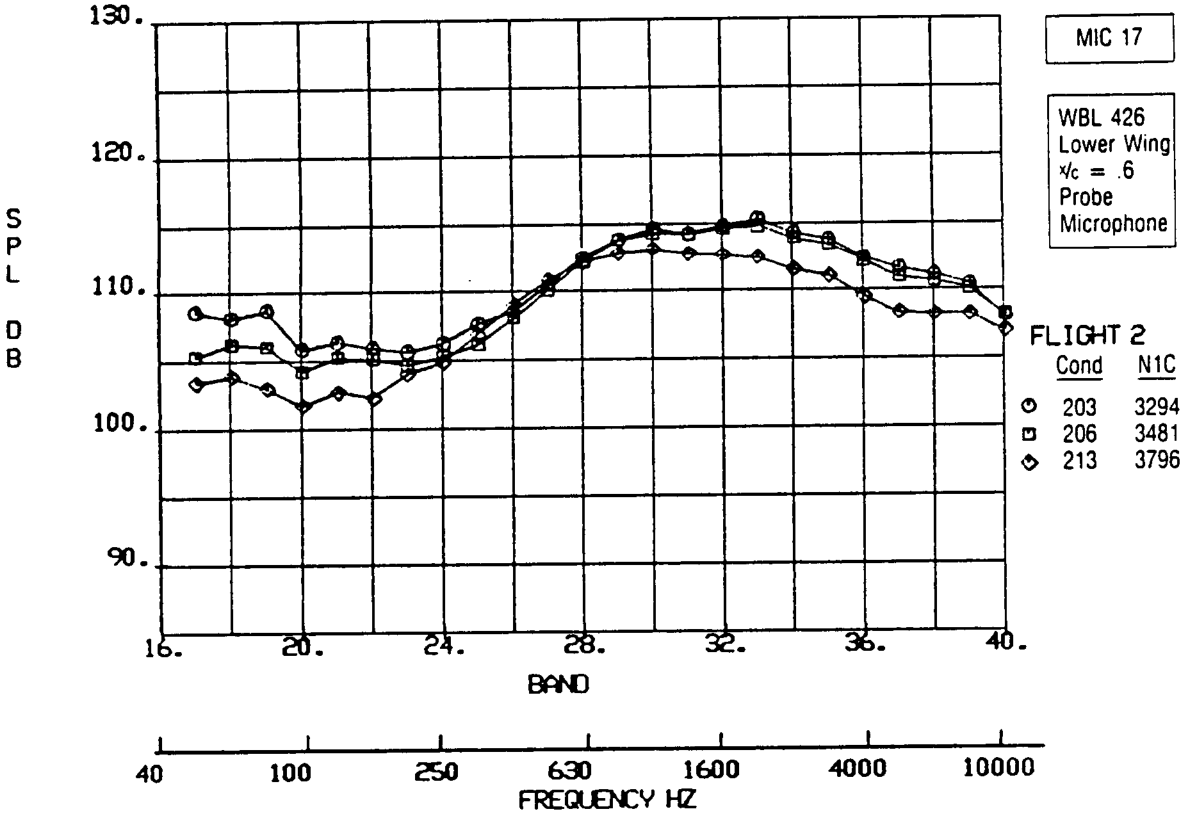


Figure 5-64. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 3, Negative Sideslip

Table 5-15. Flight 2, Category 4, Bleed Valve Noise Check

Figures 5-65 through 5-73 present the one-third-octave band acoustic data for each microphone in Category 4 from Flight 2. Pertinent data corresponding to the Category 4, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
217 C	.71	37	3557	1.06	0
218 O	.70	37	3582	1.05	0

C—Bleed valve closed
O—Bleed valve open

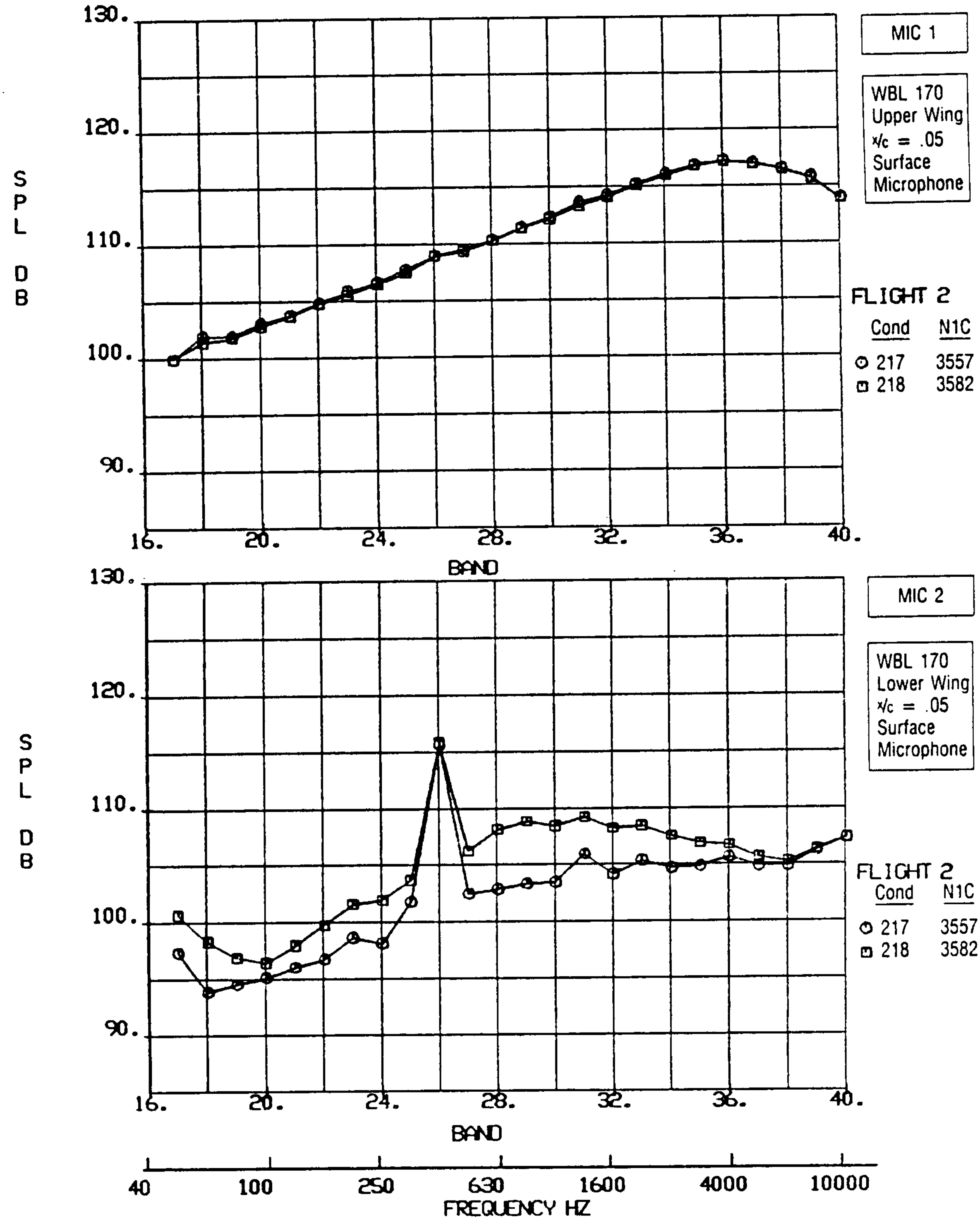


Figure 5-65. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

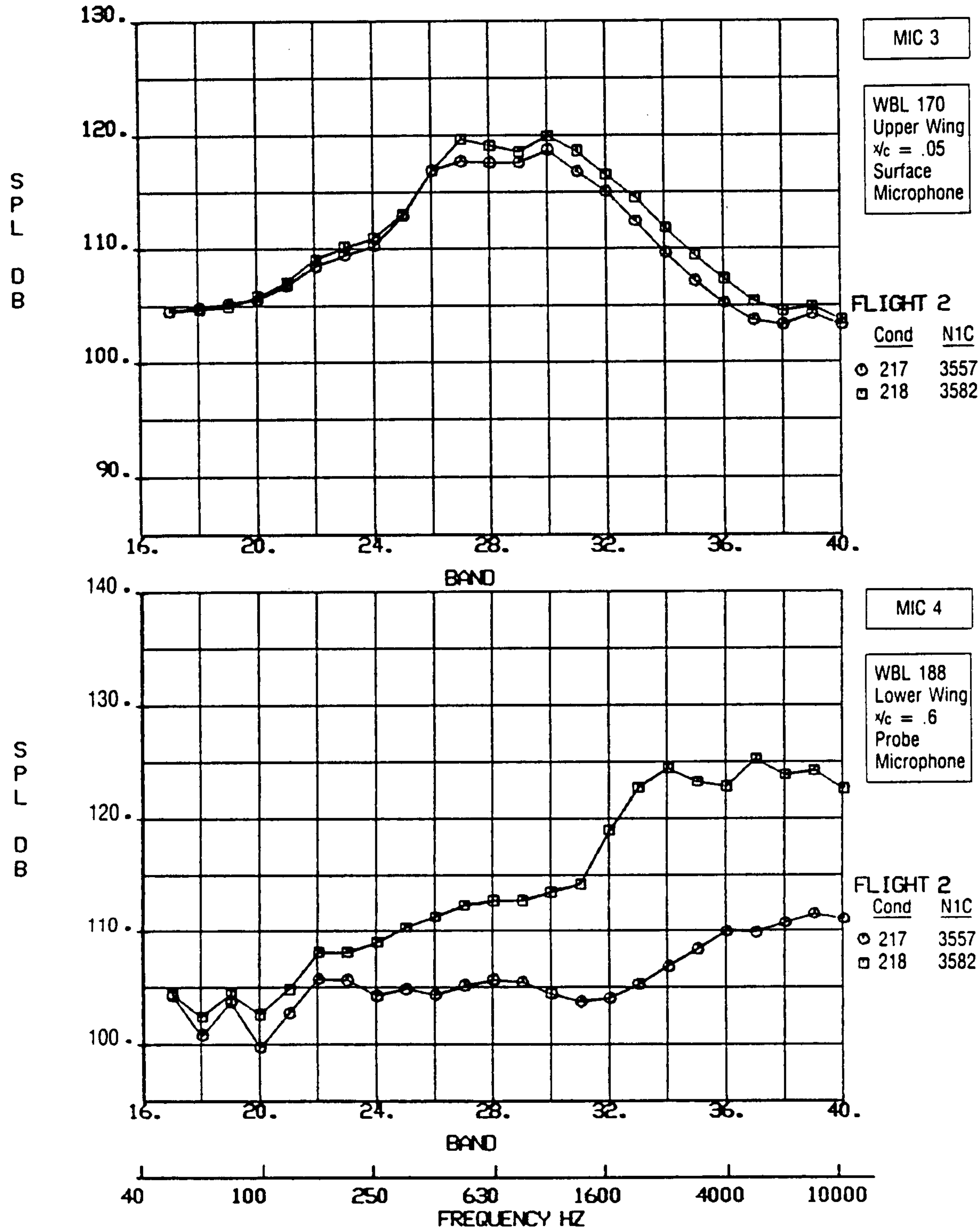


Figure 5-66. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

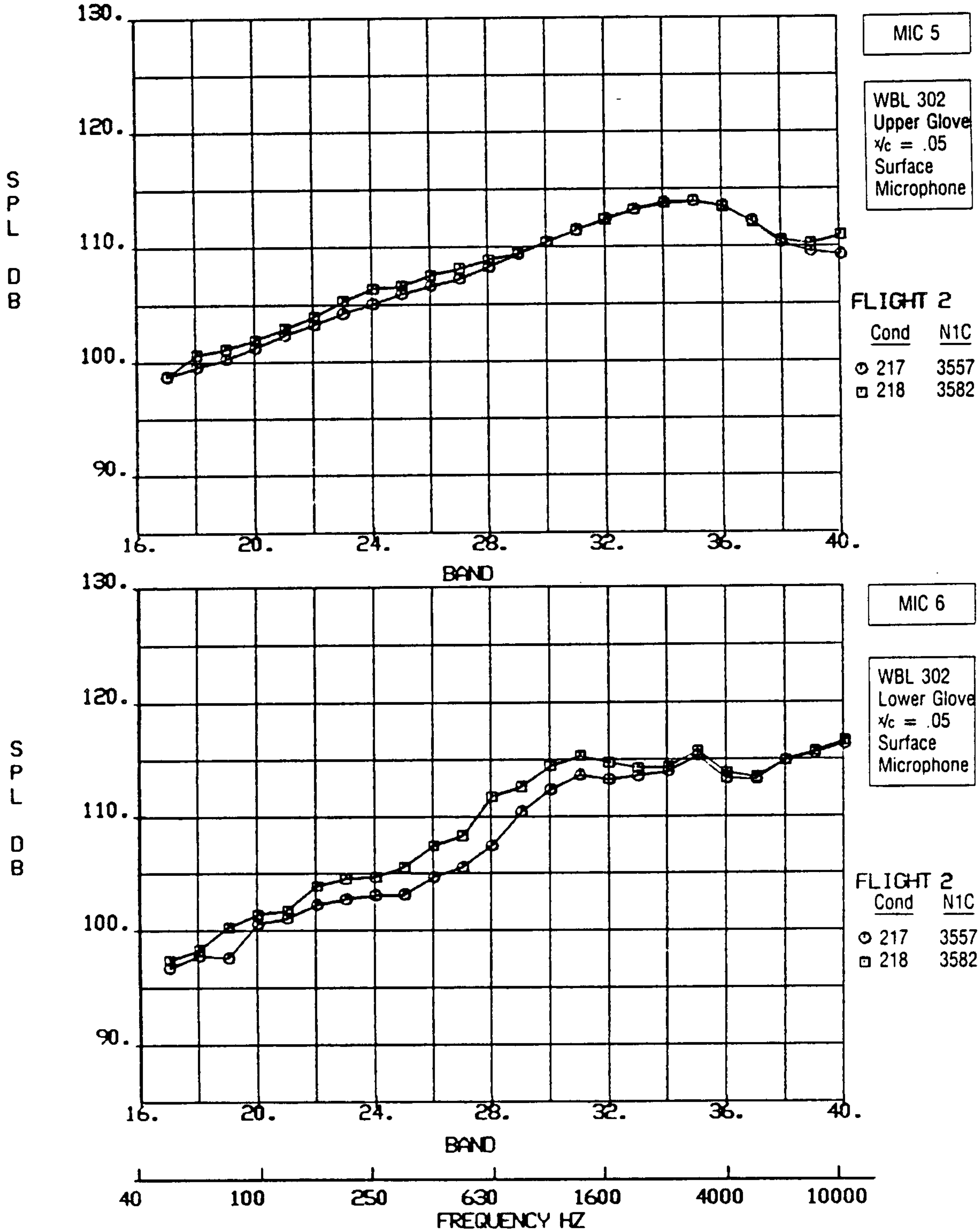


Figure 5-67. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

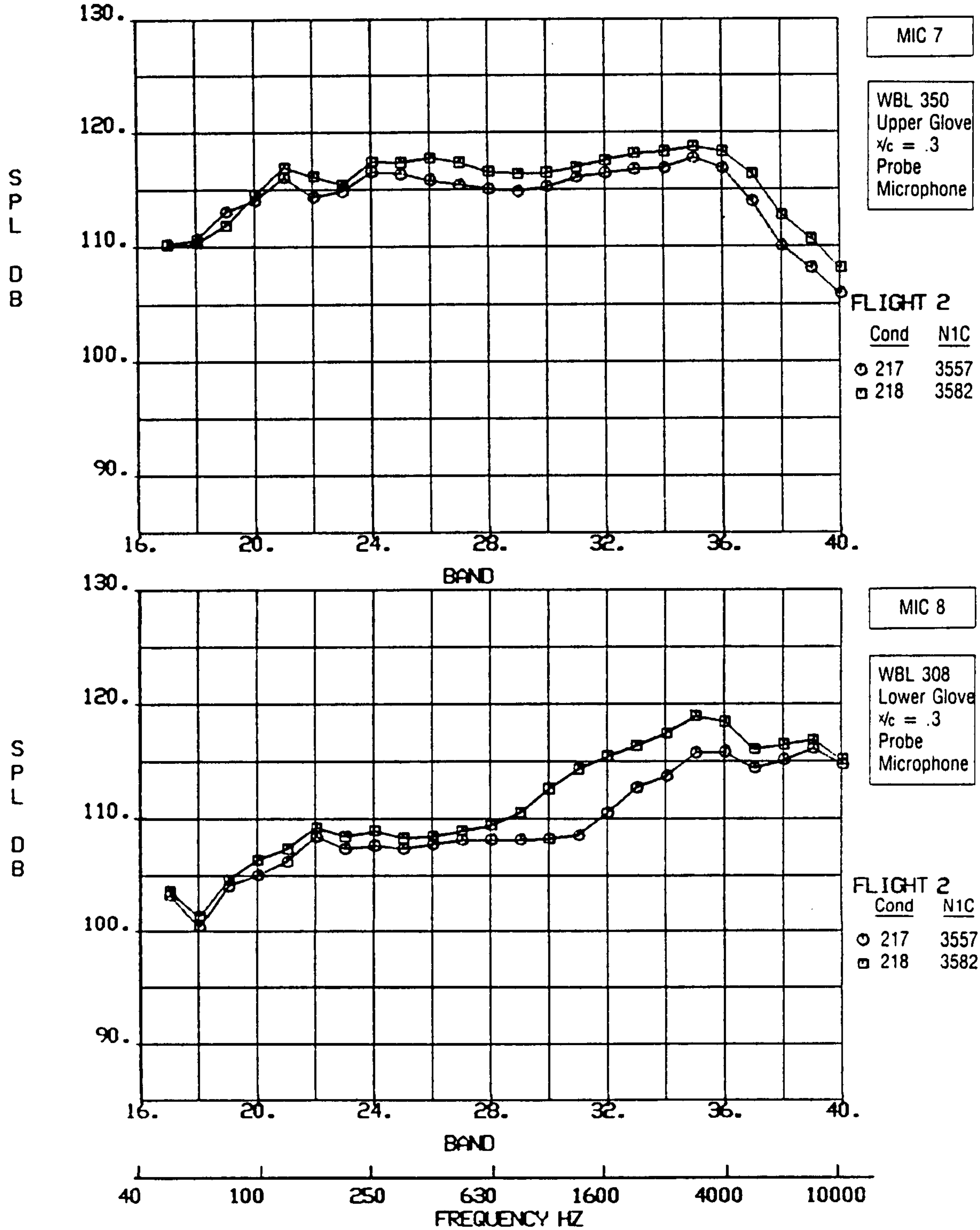
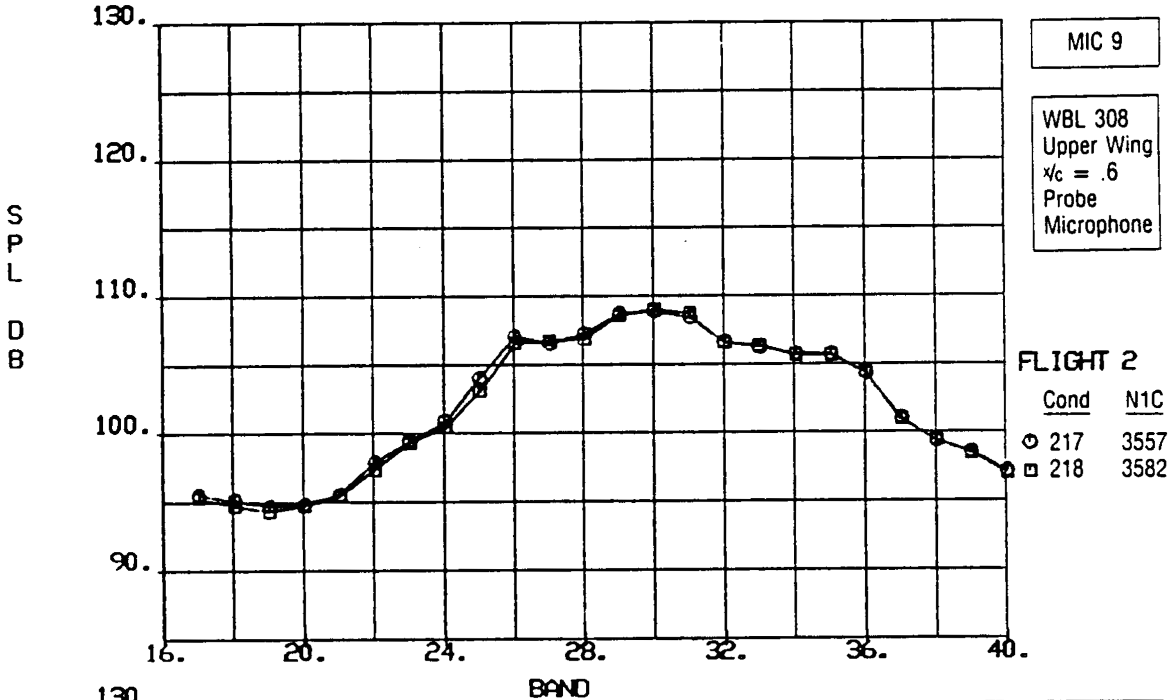


Figure 5-68. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check



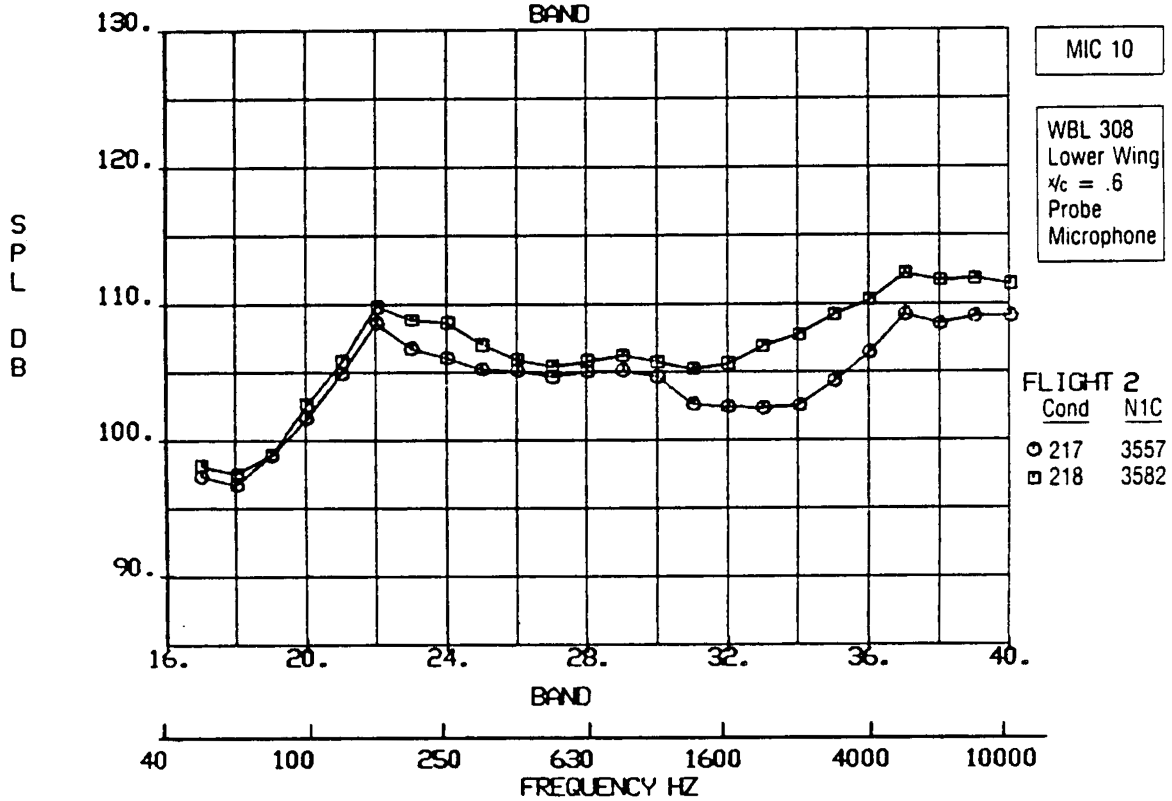


Figure 5-69. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

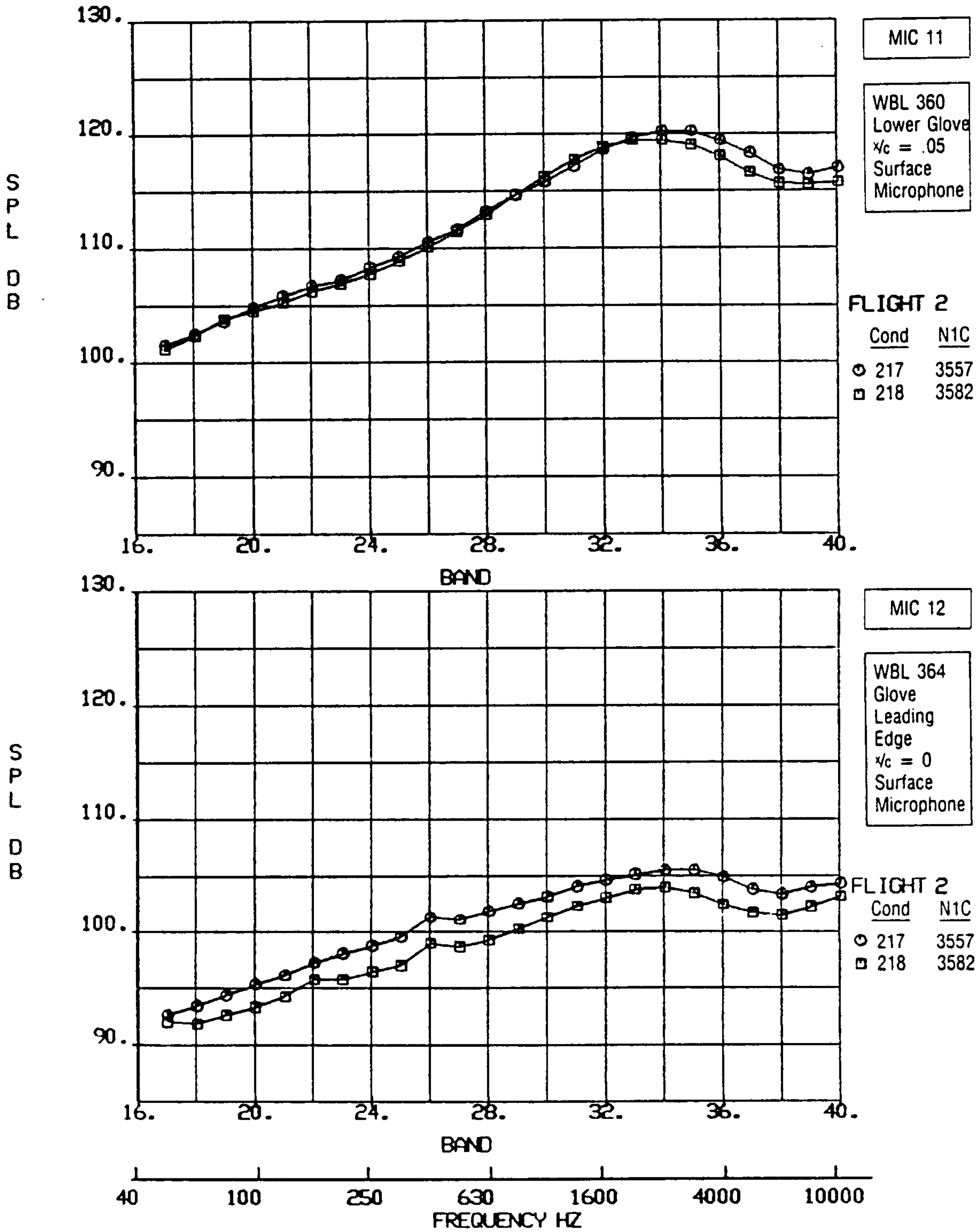


Figure 5-70. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

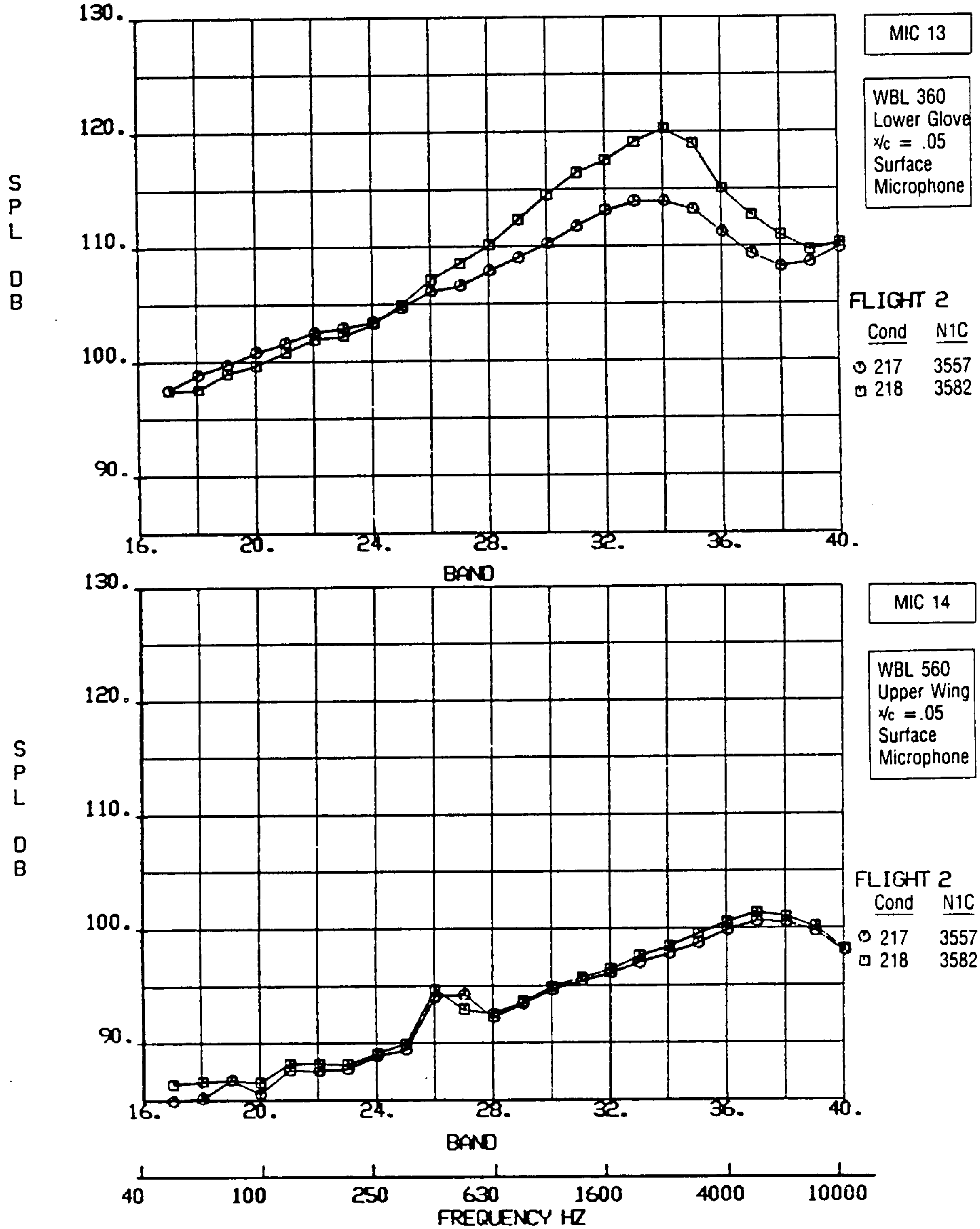


Figure 5-71. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

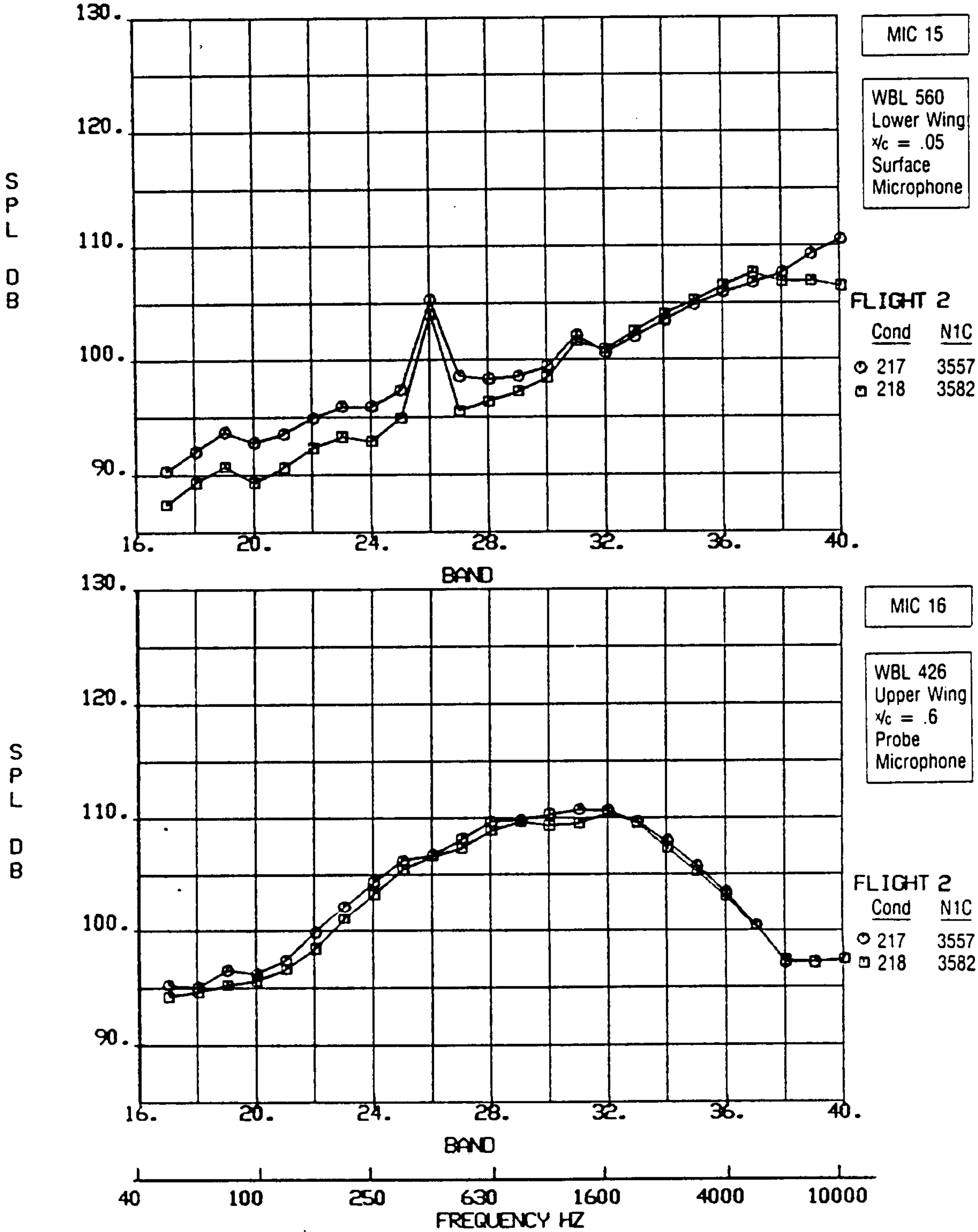


Figure 5-72. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

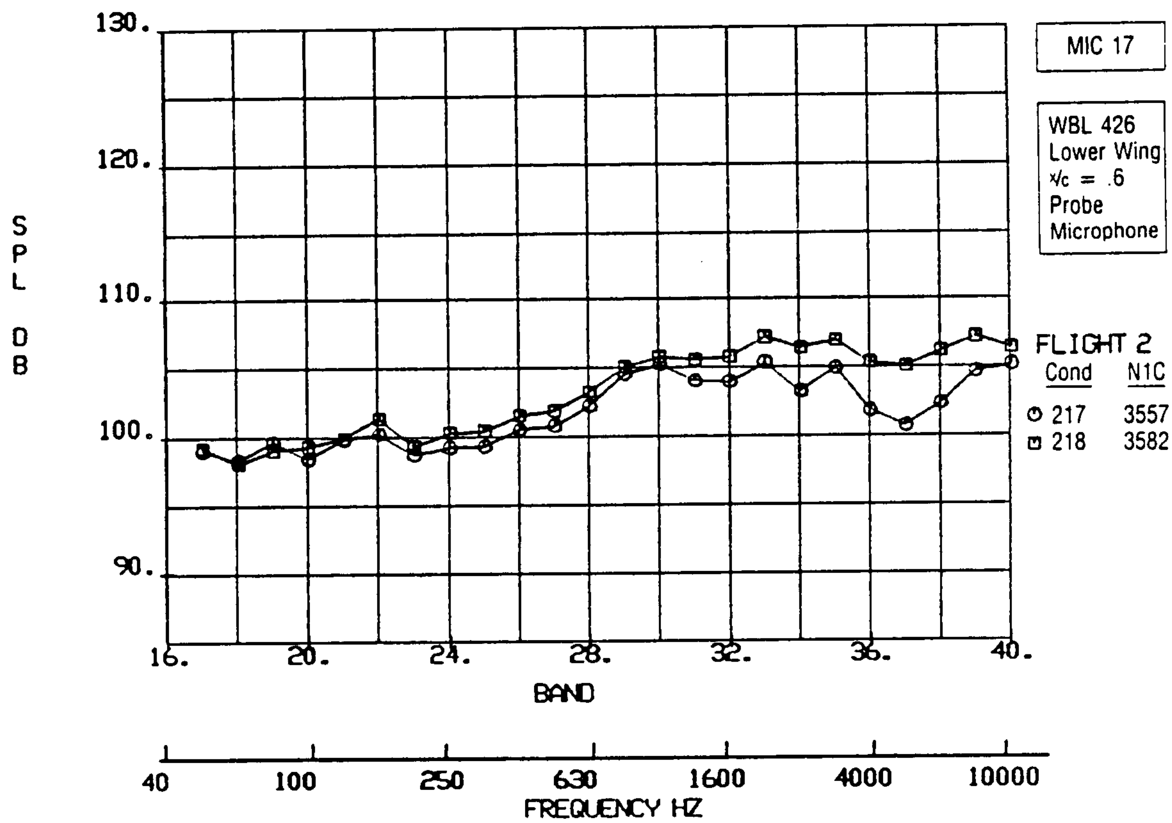


Figure 5-73. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 4, Bleed Valve Noise Check

Table 5-16. Flight 2, Category 5, Engine Power Variation M_{AP} = 0.63

Figures 5-74 through 5-82 present the one-third-octave band acoustic data for each microphone in Category 5 from Flight 2. Pertinent data corresponding to the Category 5, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
219.1	.64	35	4493	1.19	0
220.1	.62	35	2928	.86	0
221	.63	35	2315	.76	0

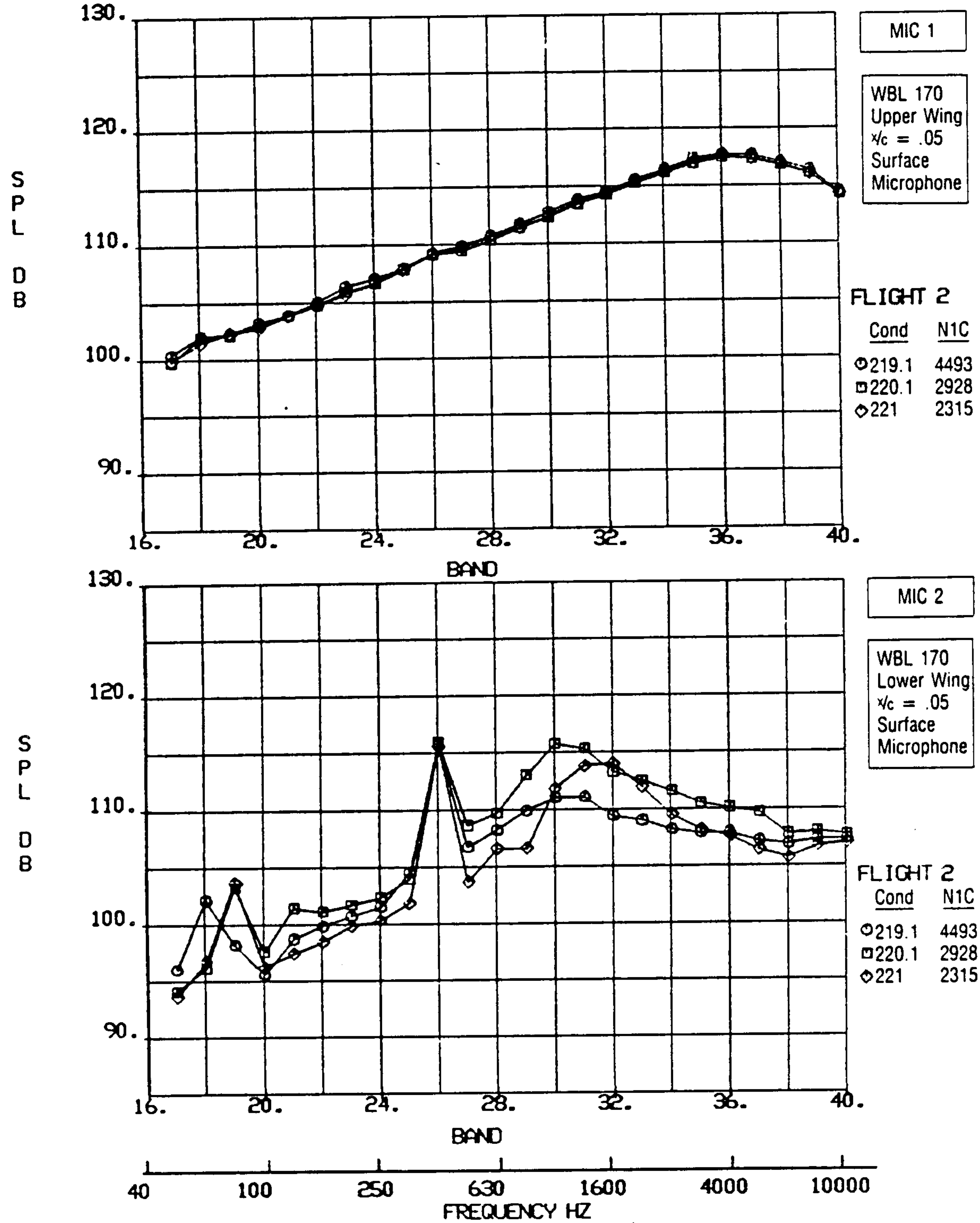


Figure 5-74. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

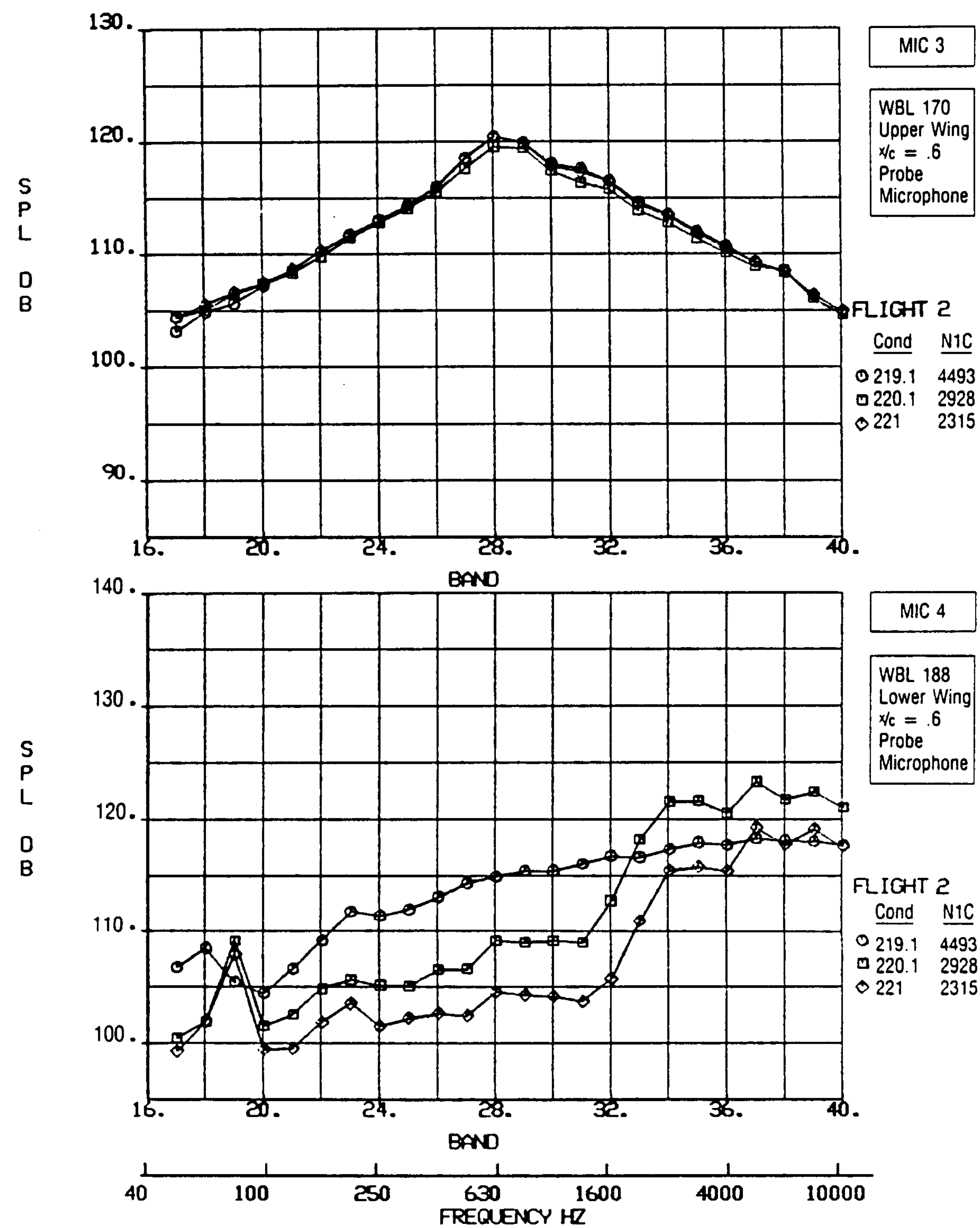


Figure 5-75. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

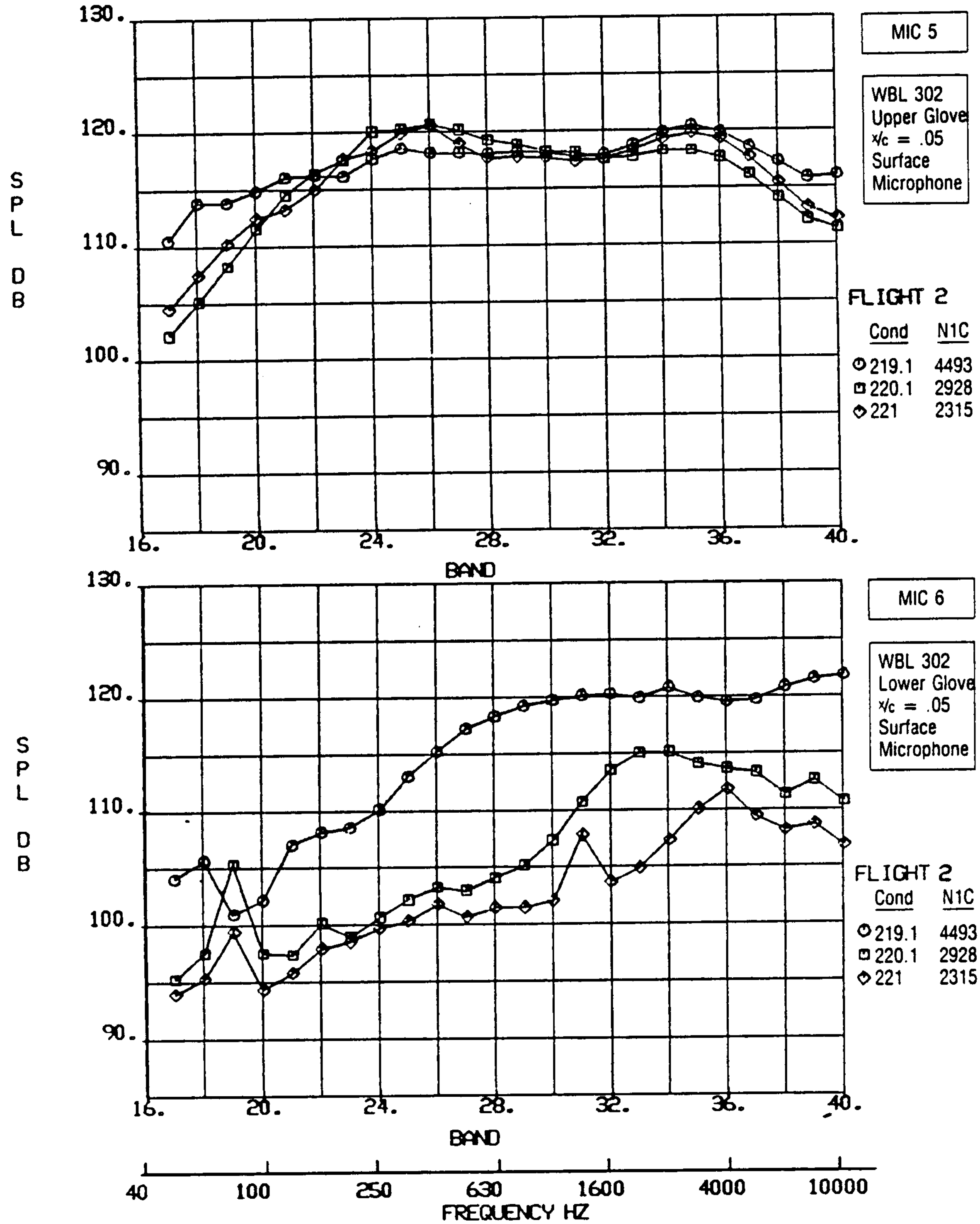


Figure 5-76. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

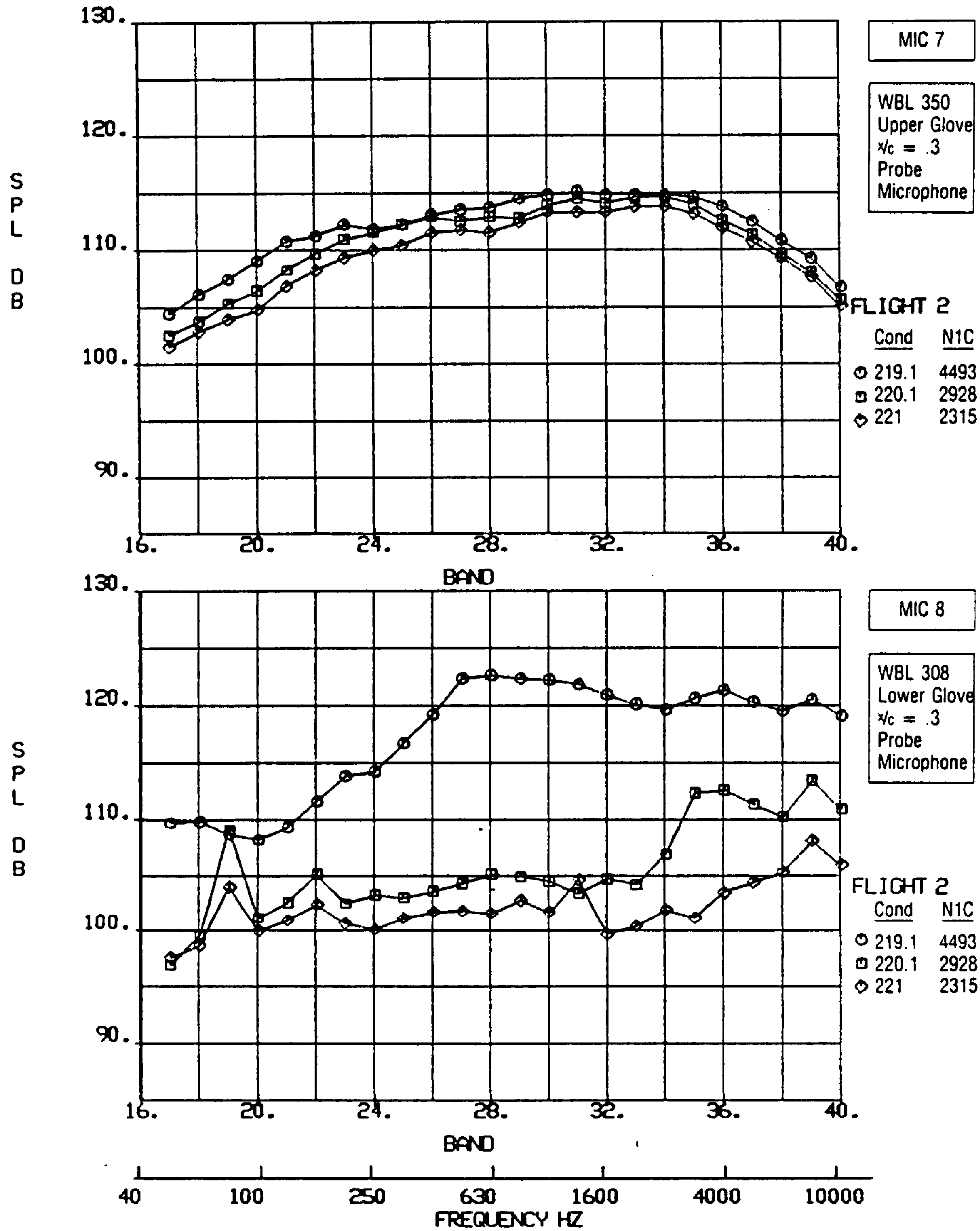


Figure 5-77. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

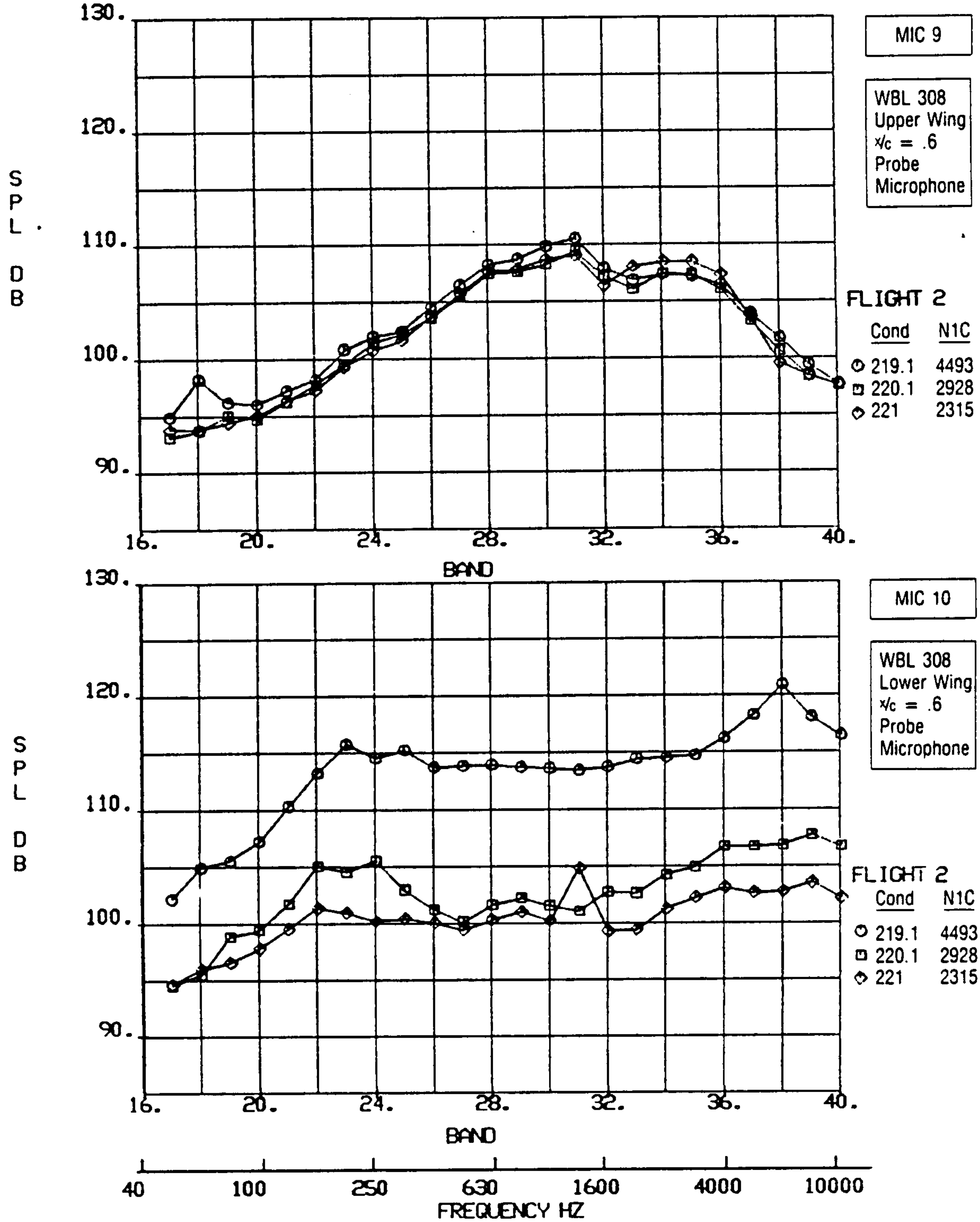


Figure 5-78. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

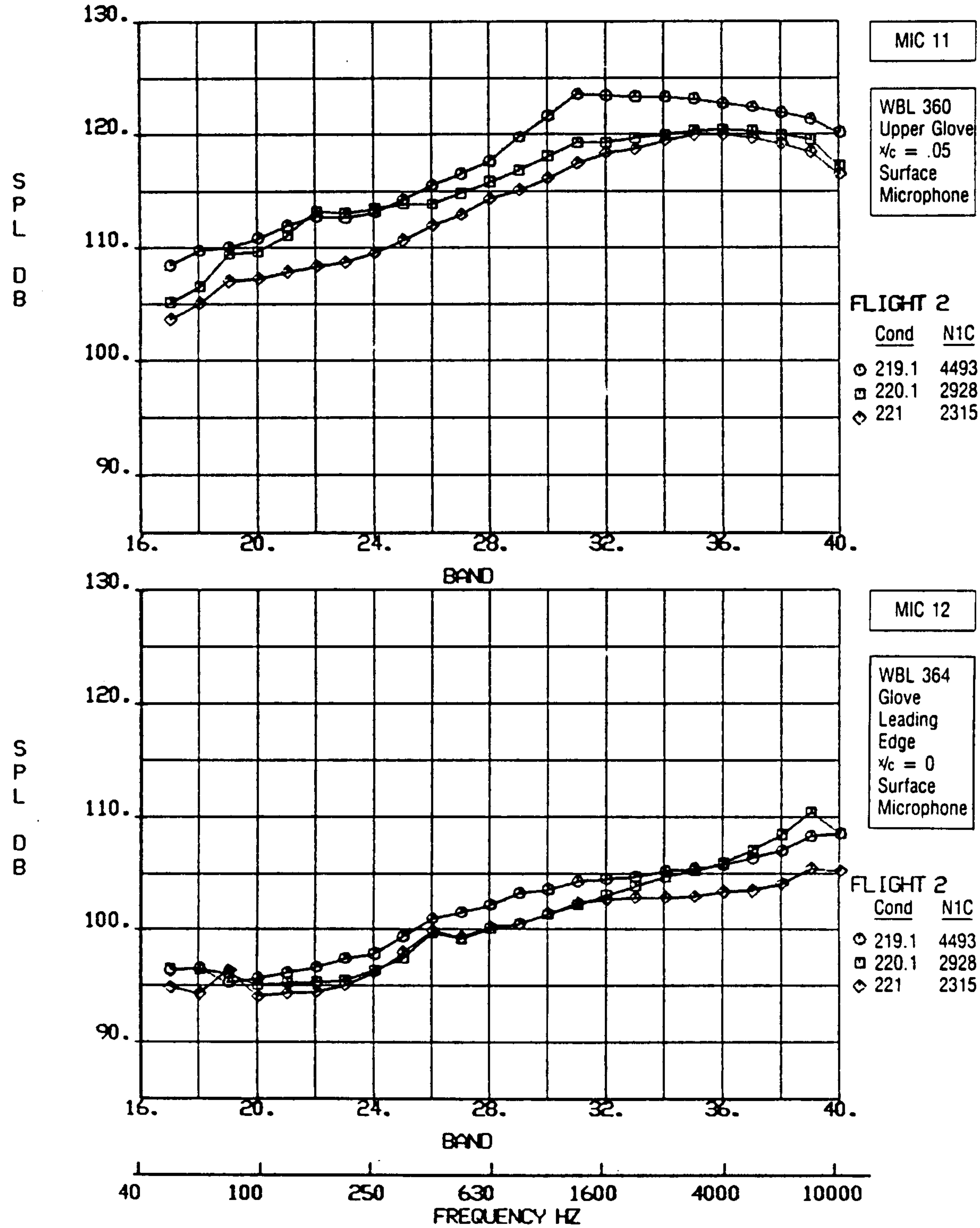


Figure 5-79. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

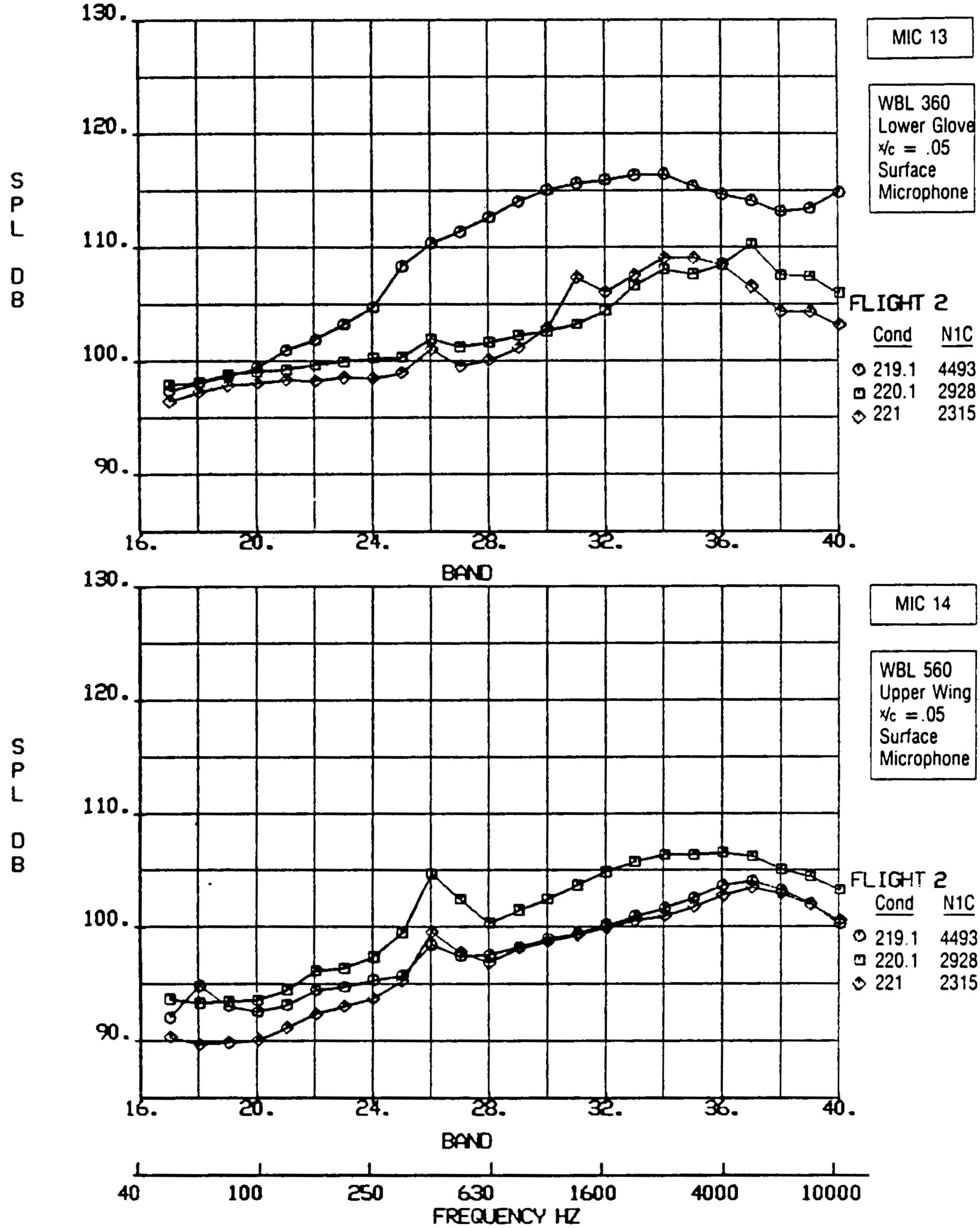


Figure 5-80. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

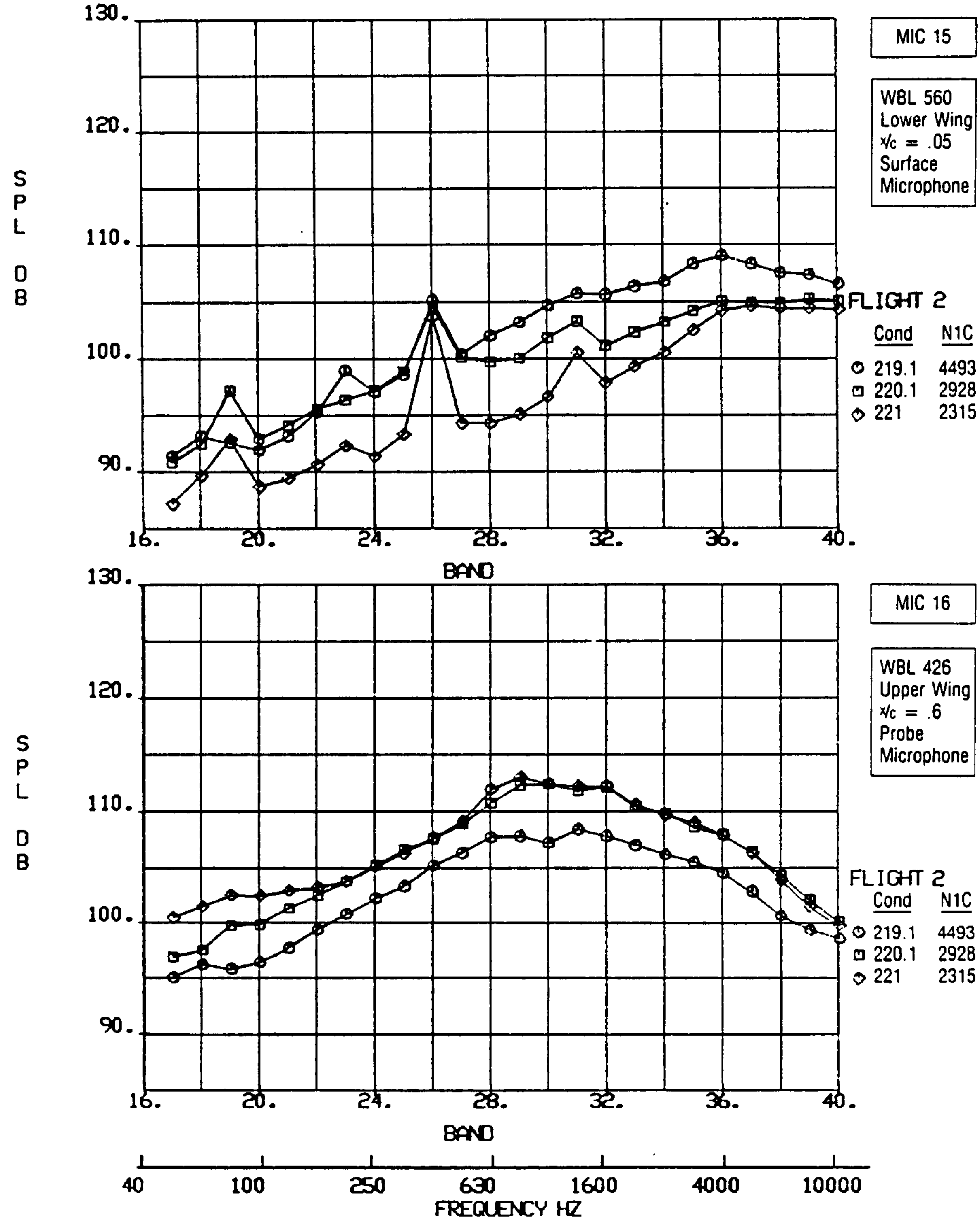


Figure 5-81. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

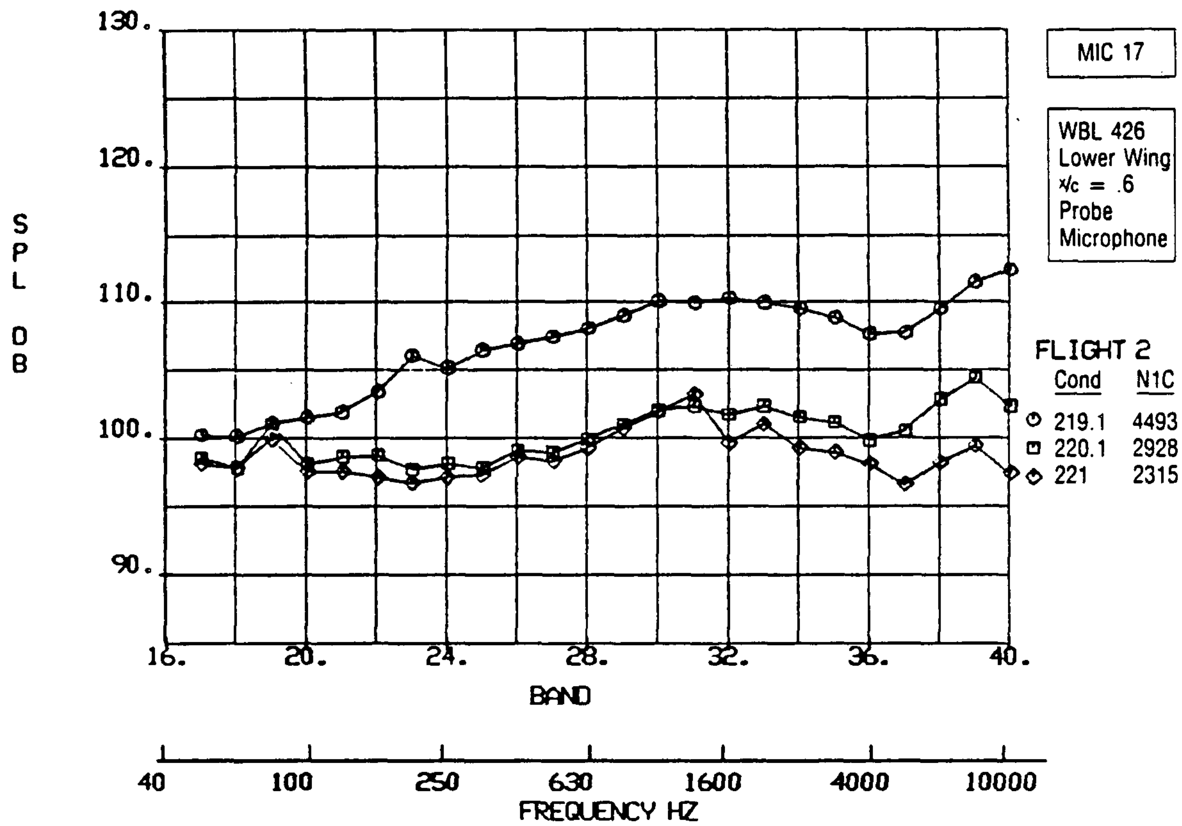


Figure 5-82. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

Narrowband analysis results are presented in Figures 5-83 through 5-91 for the Category 5, flight conditions from Flight 2.

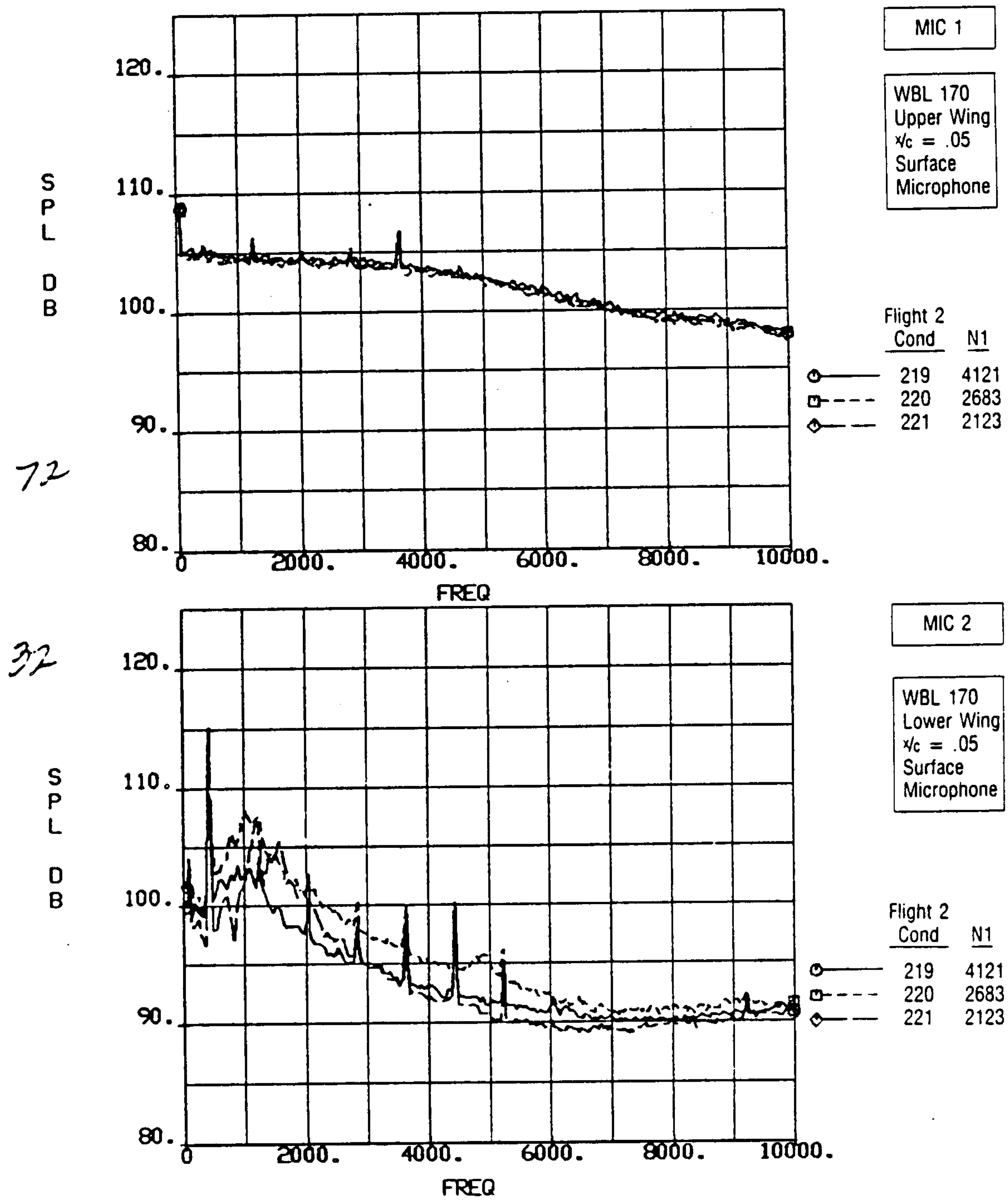


Figure 5-83. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

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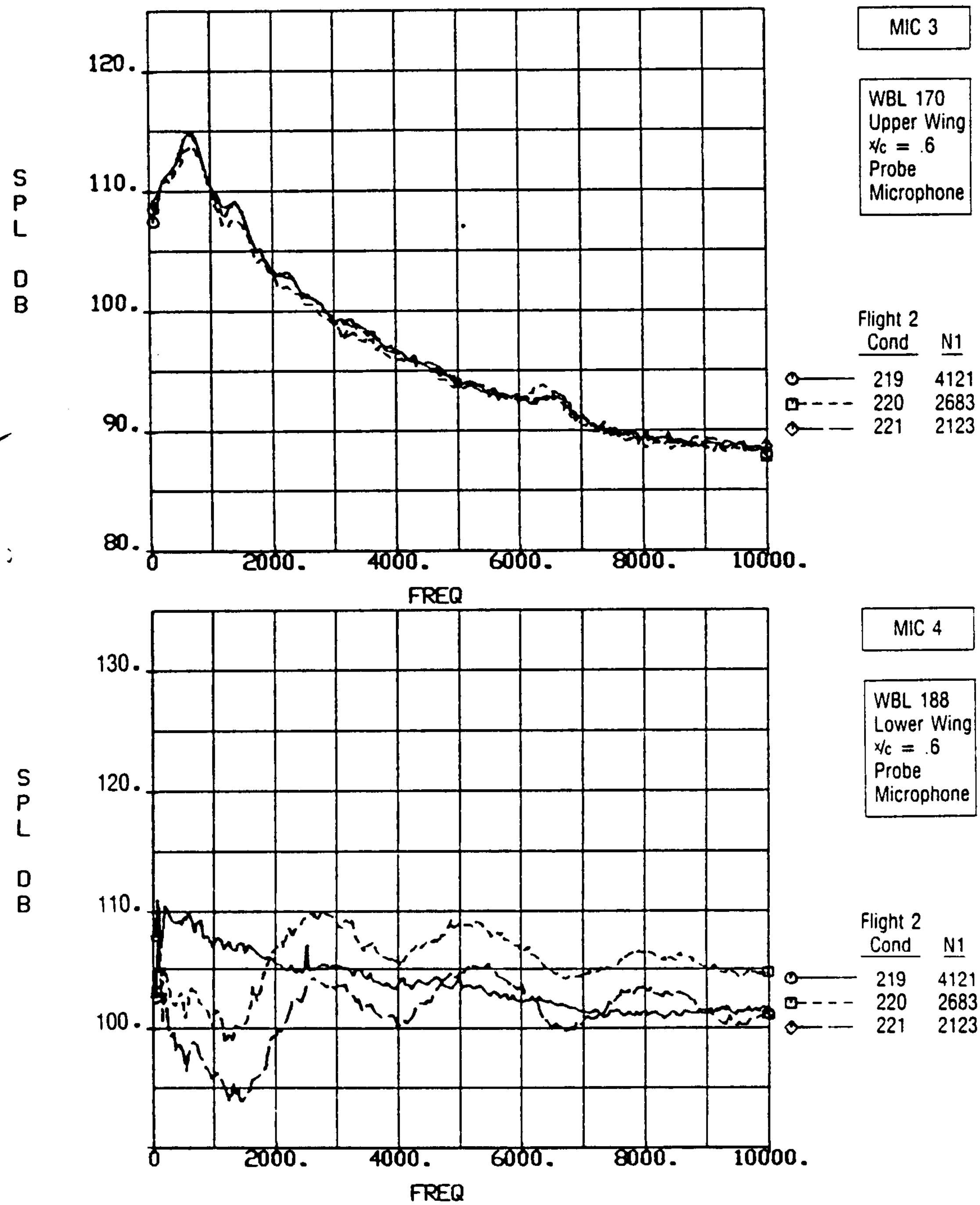

Figure 5-84. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

73

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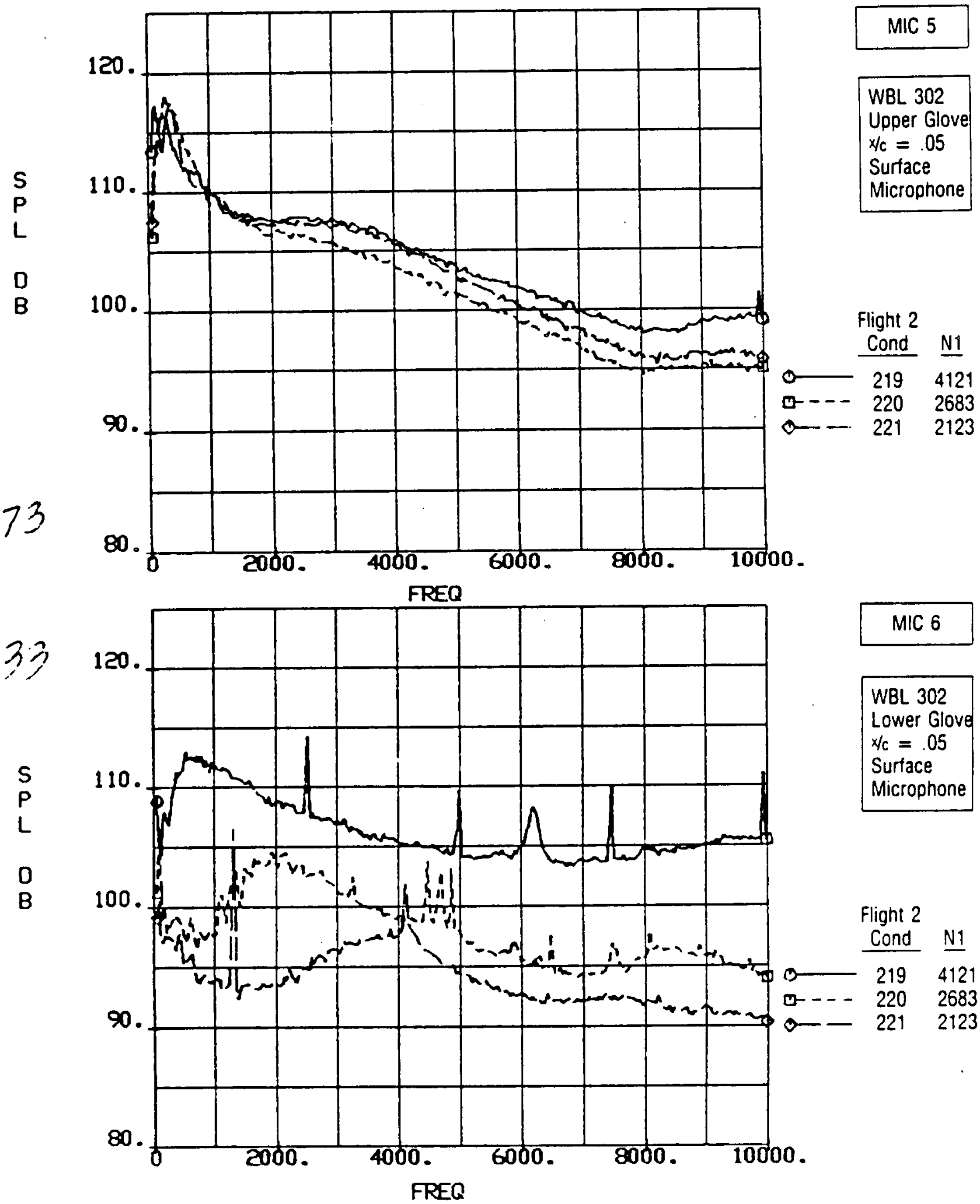

Figure 5-85. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, $M_{AP} = 0.63$

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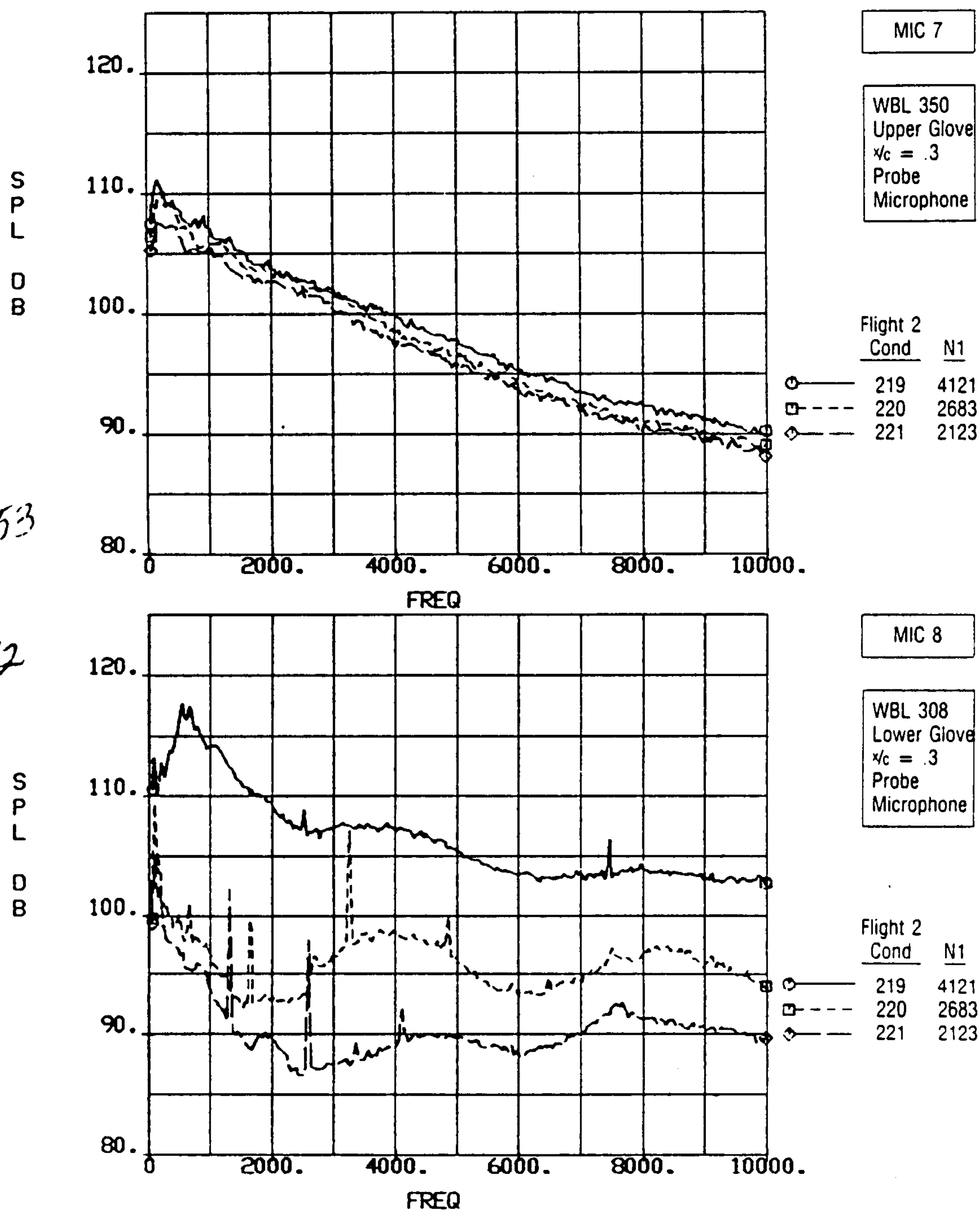

Figure 5-86. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

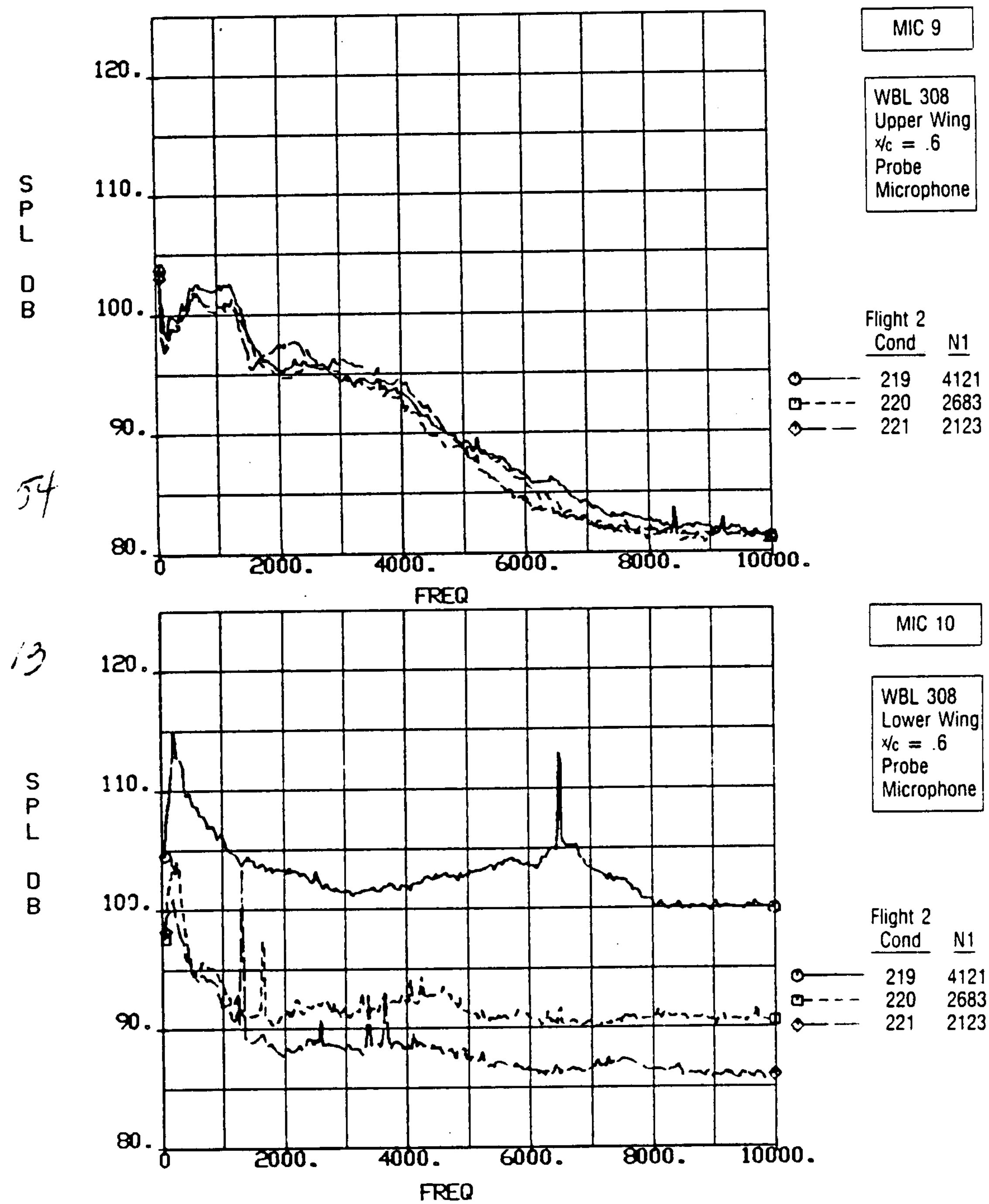

Figure 5-87. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

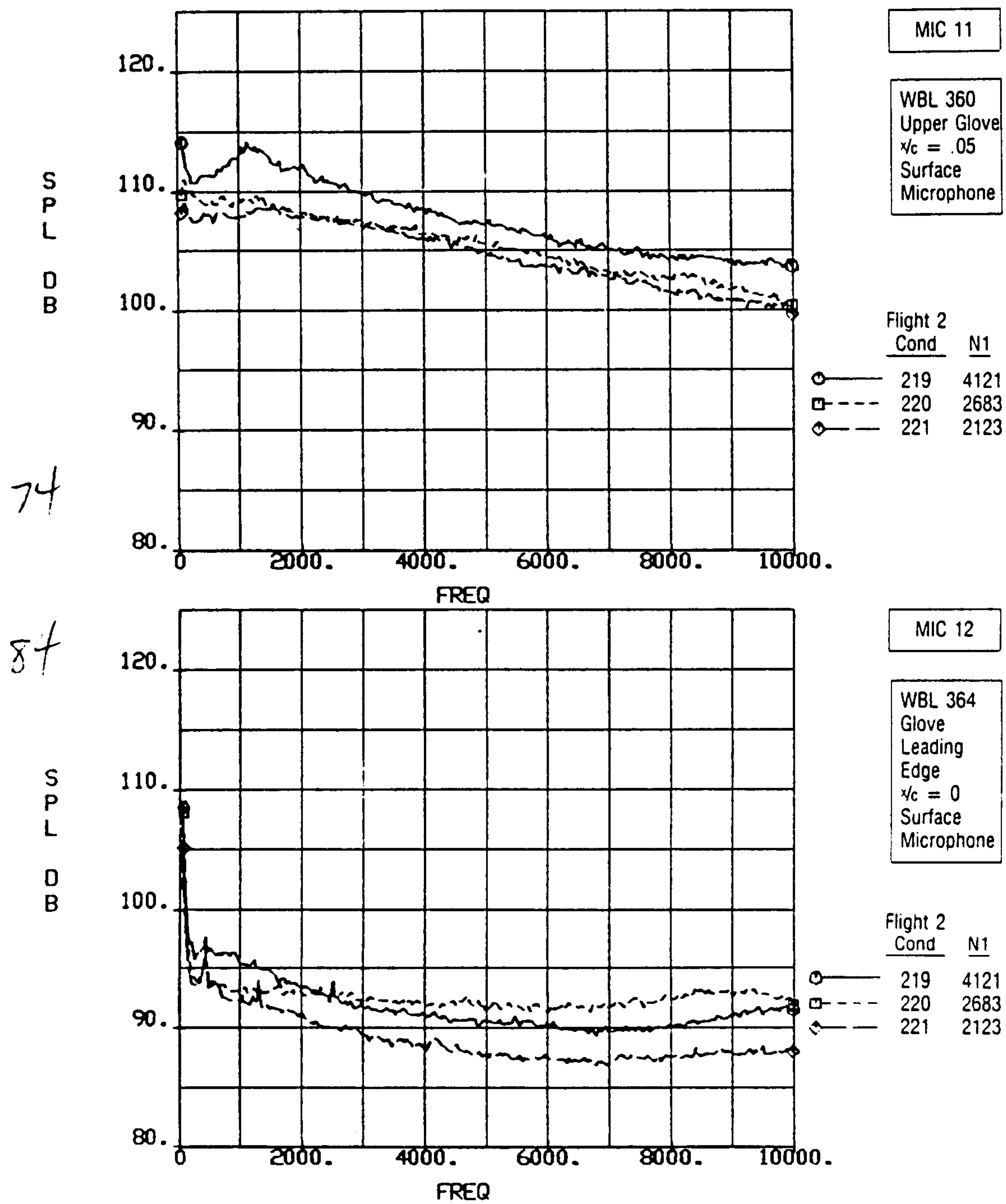

Figure 5-88. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

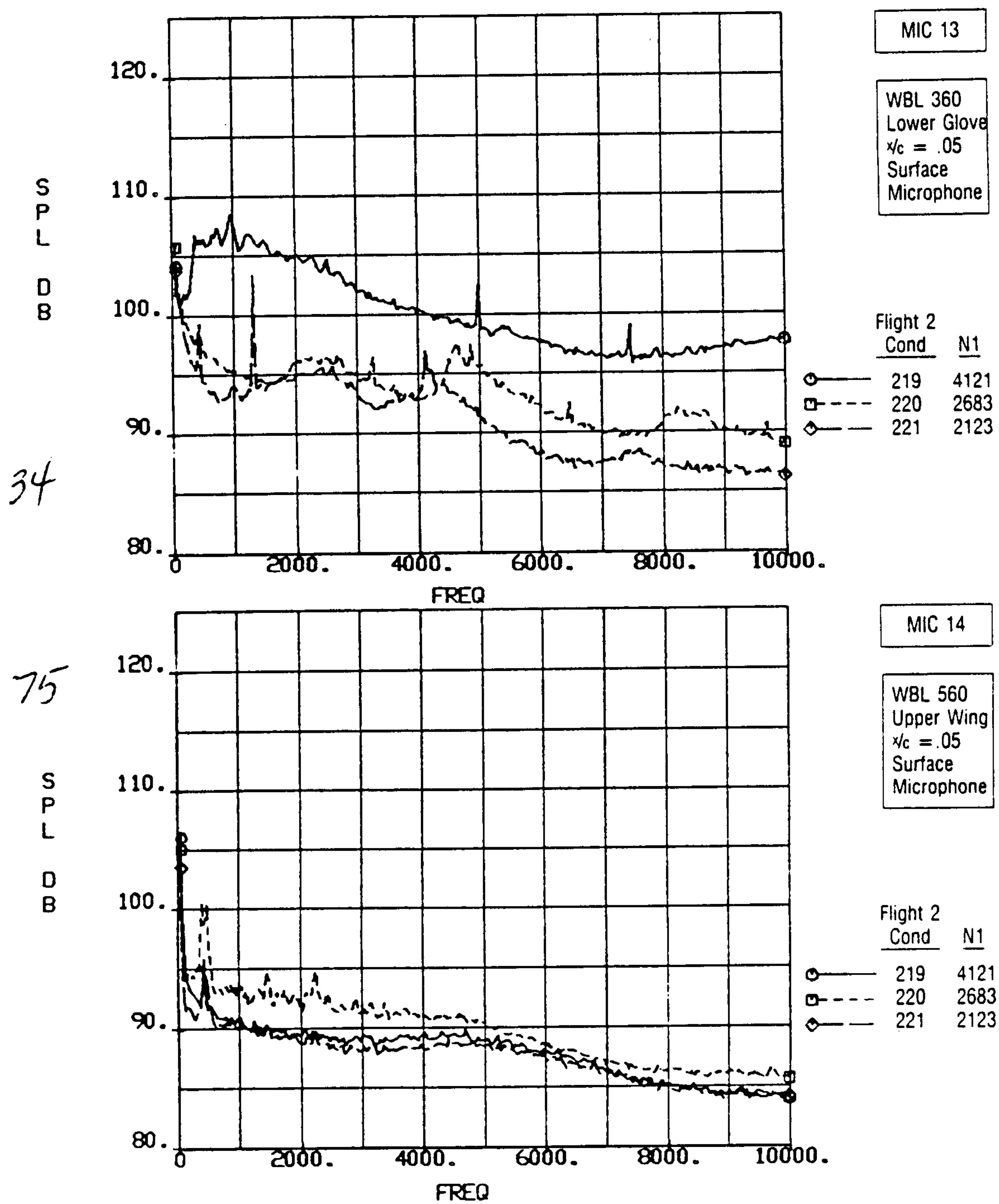

Figure 5-89. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

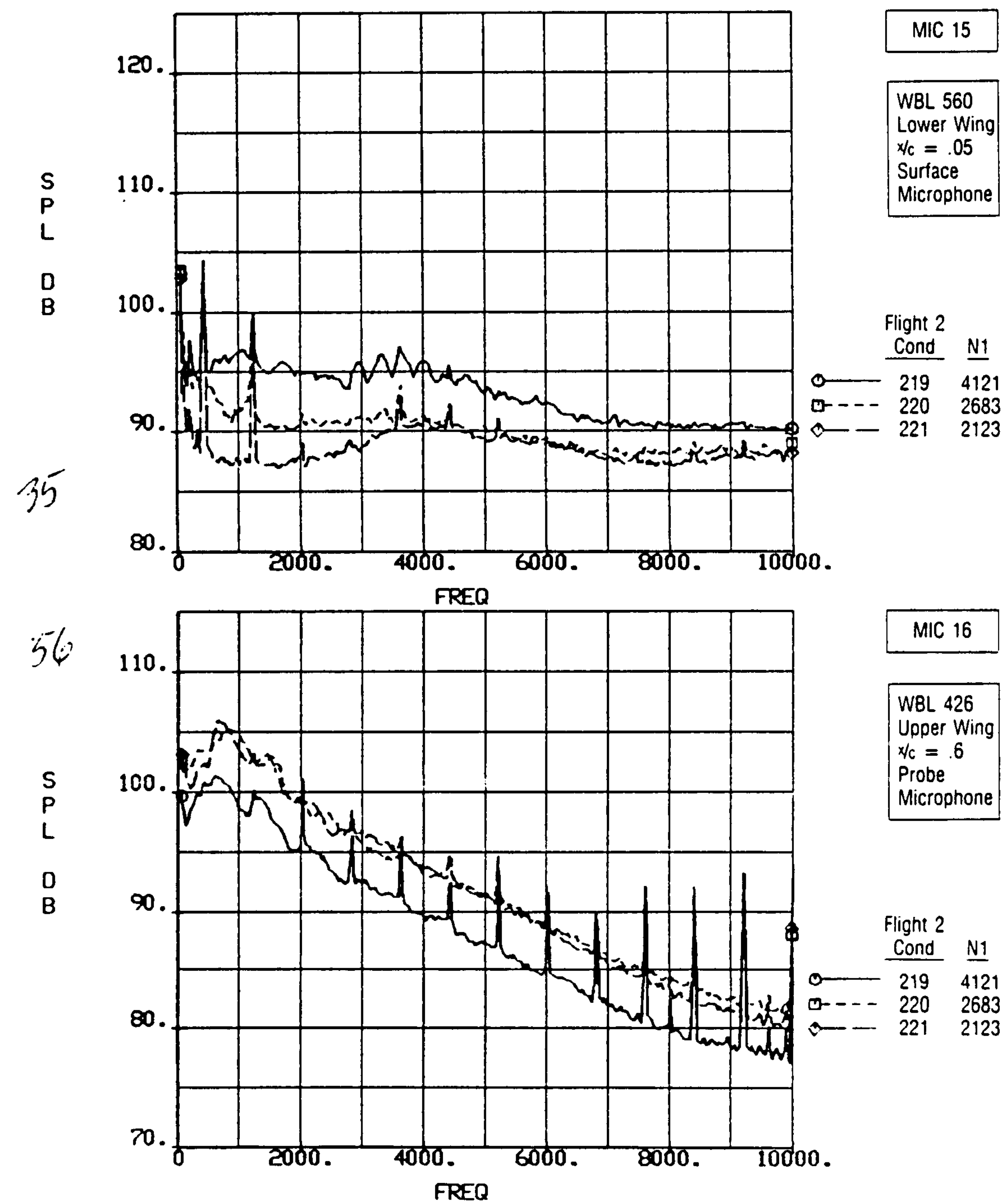

Figure 5-90. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

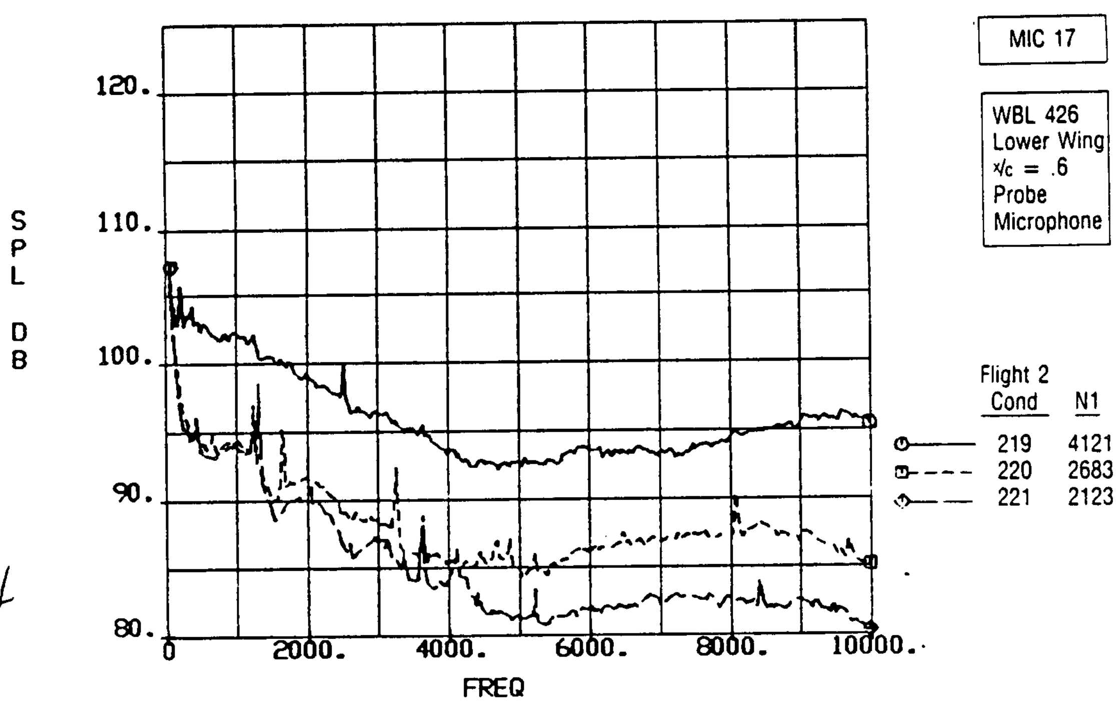

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Figure 5-91. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 5, Engine Power Variation, M_{AP} = 0.63

Table 5-17. Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

Figures 5-92 through 5-100 present the one-third-octave band acoustic data for each microphone in Category 6 from Flight 2. Pertinent data corresponding to the Category 6, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
223	.80	40.5	4340	1.28	0
224	.80	40.5	4102	1.24	0
225	.80	40.5	3793	1.18	0
228	.79	41.3	2645	.94	0

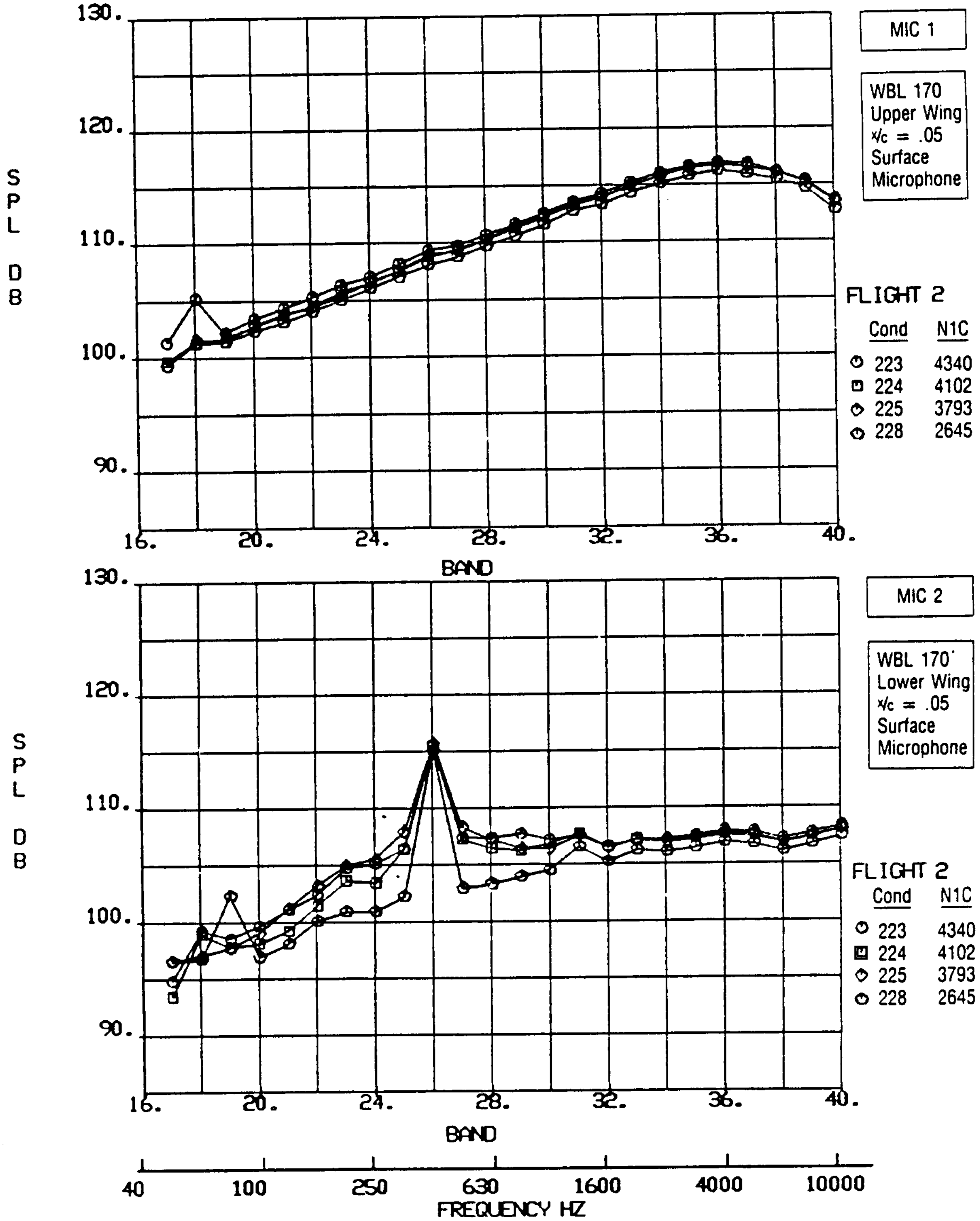

Figure 5-92. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

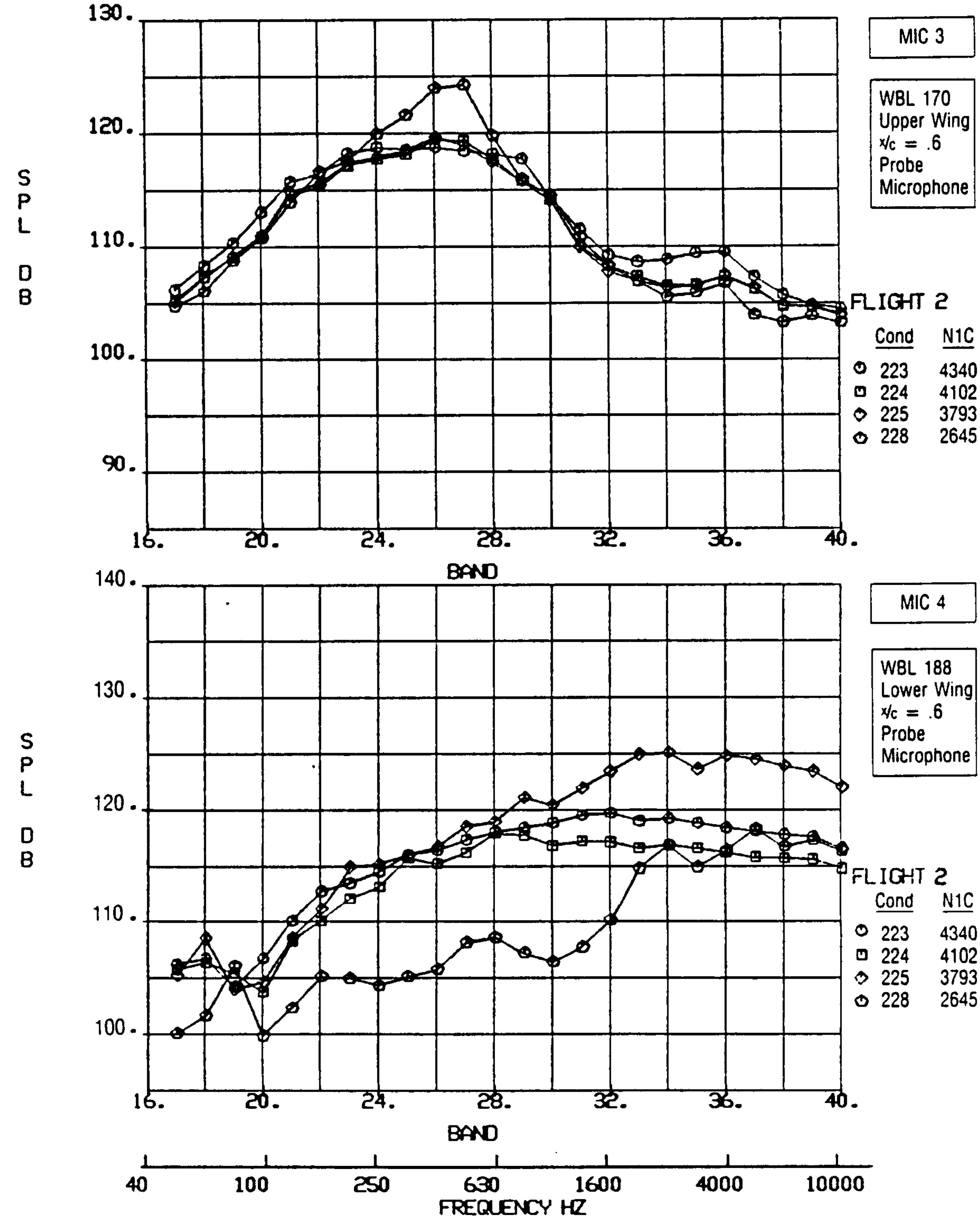

Figure 5-93. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

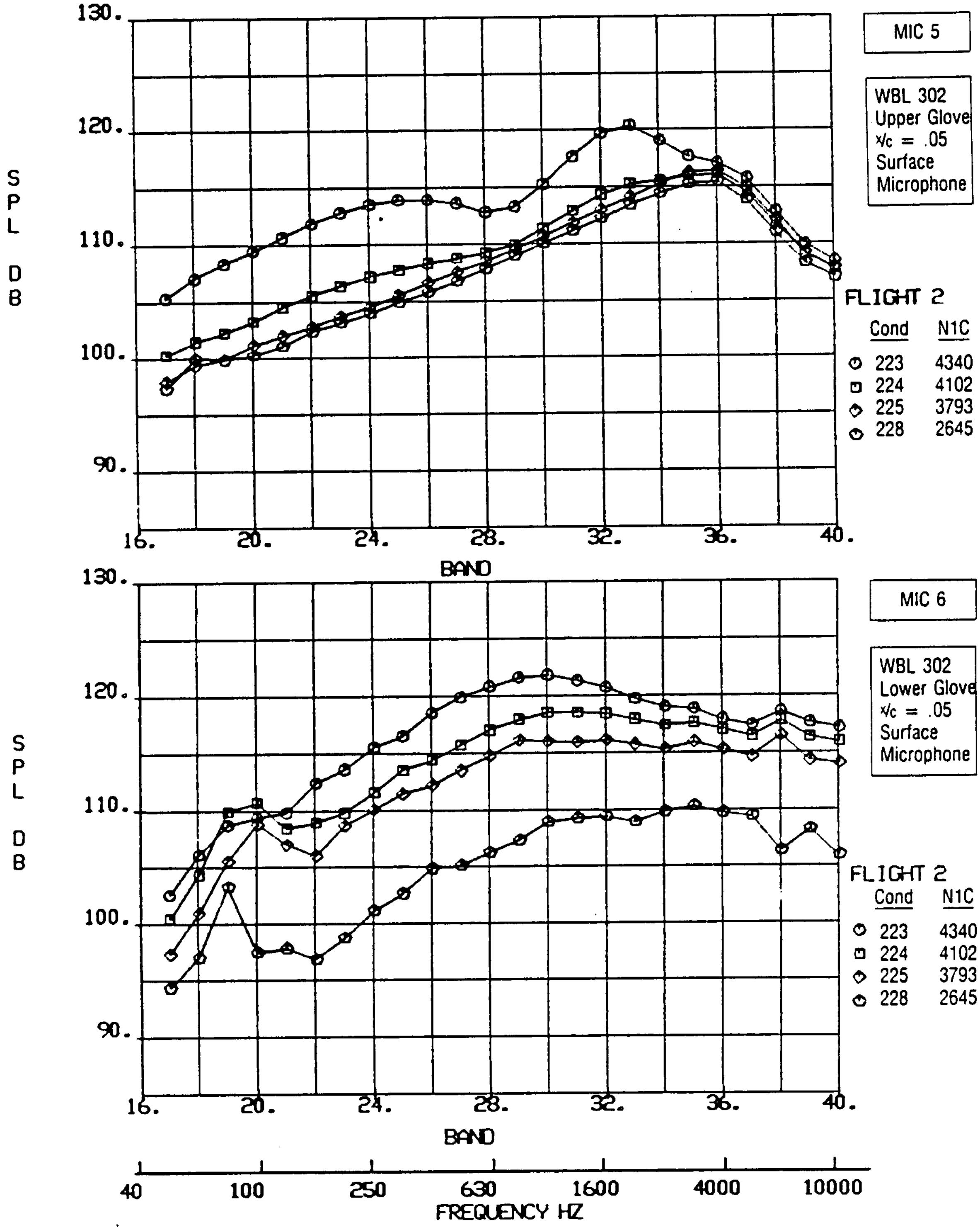

Figure 5-94. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

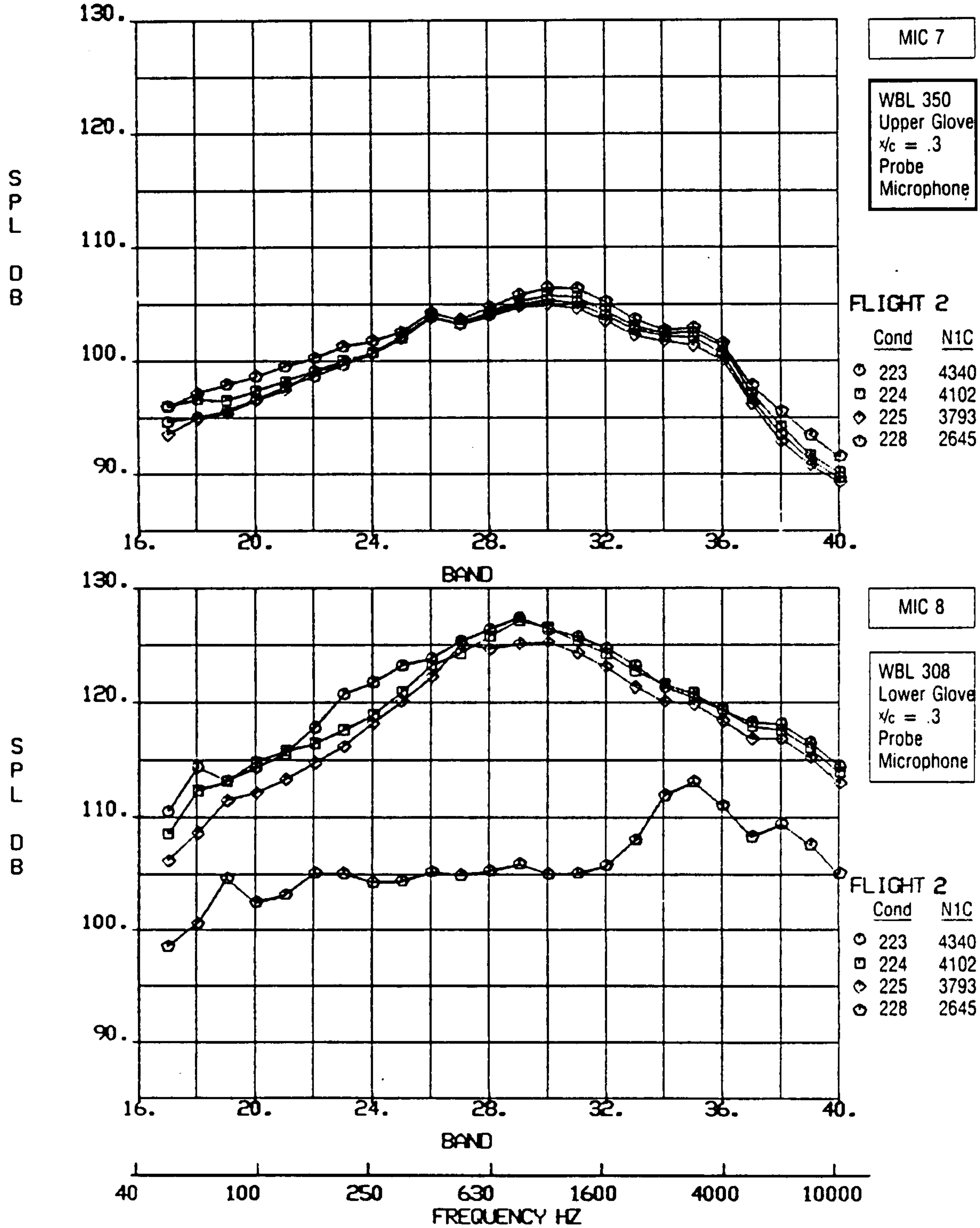

Figure 5-95. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

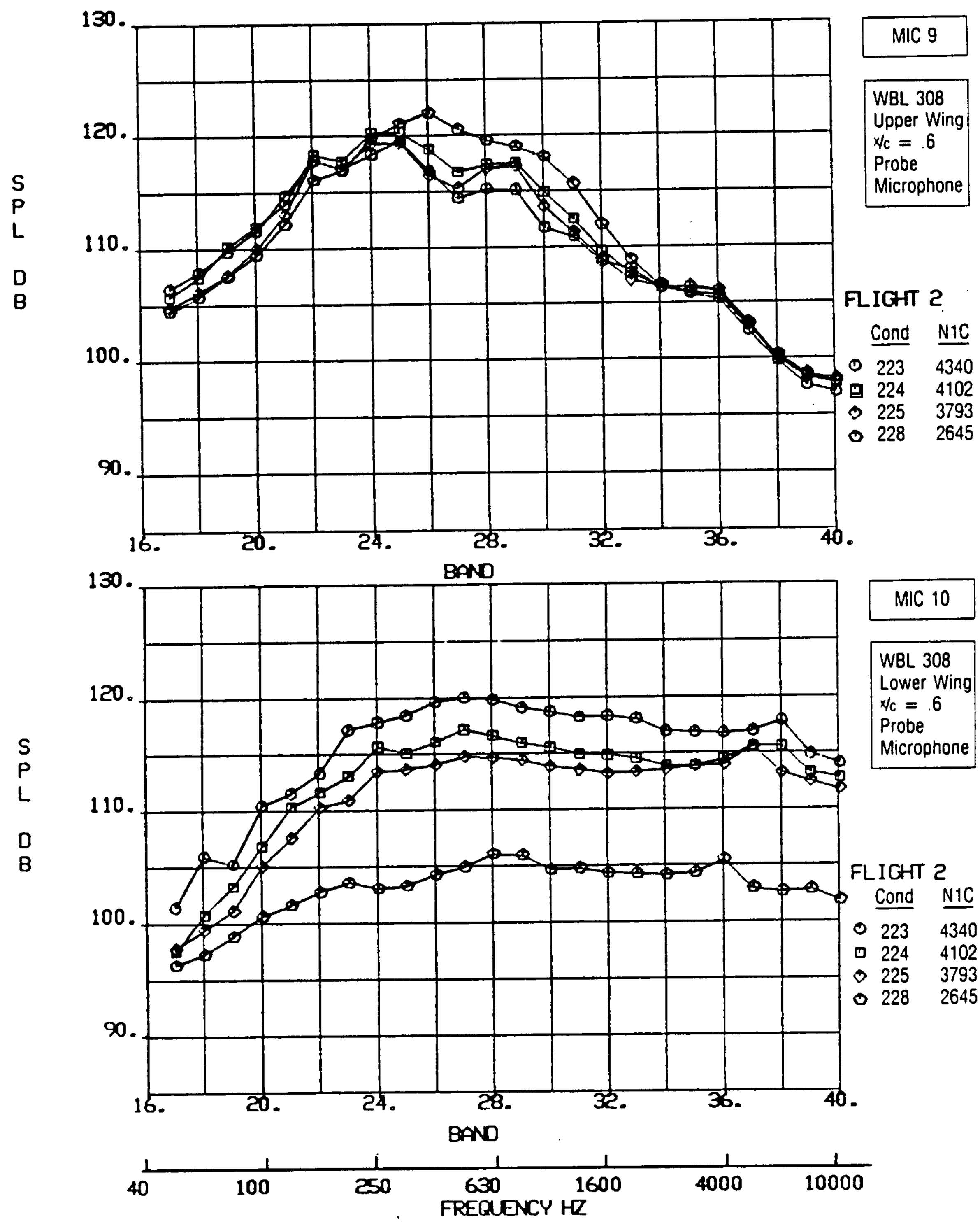

Figure 5-96. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

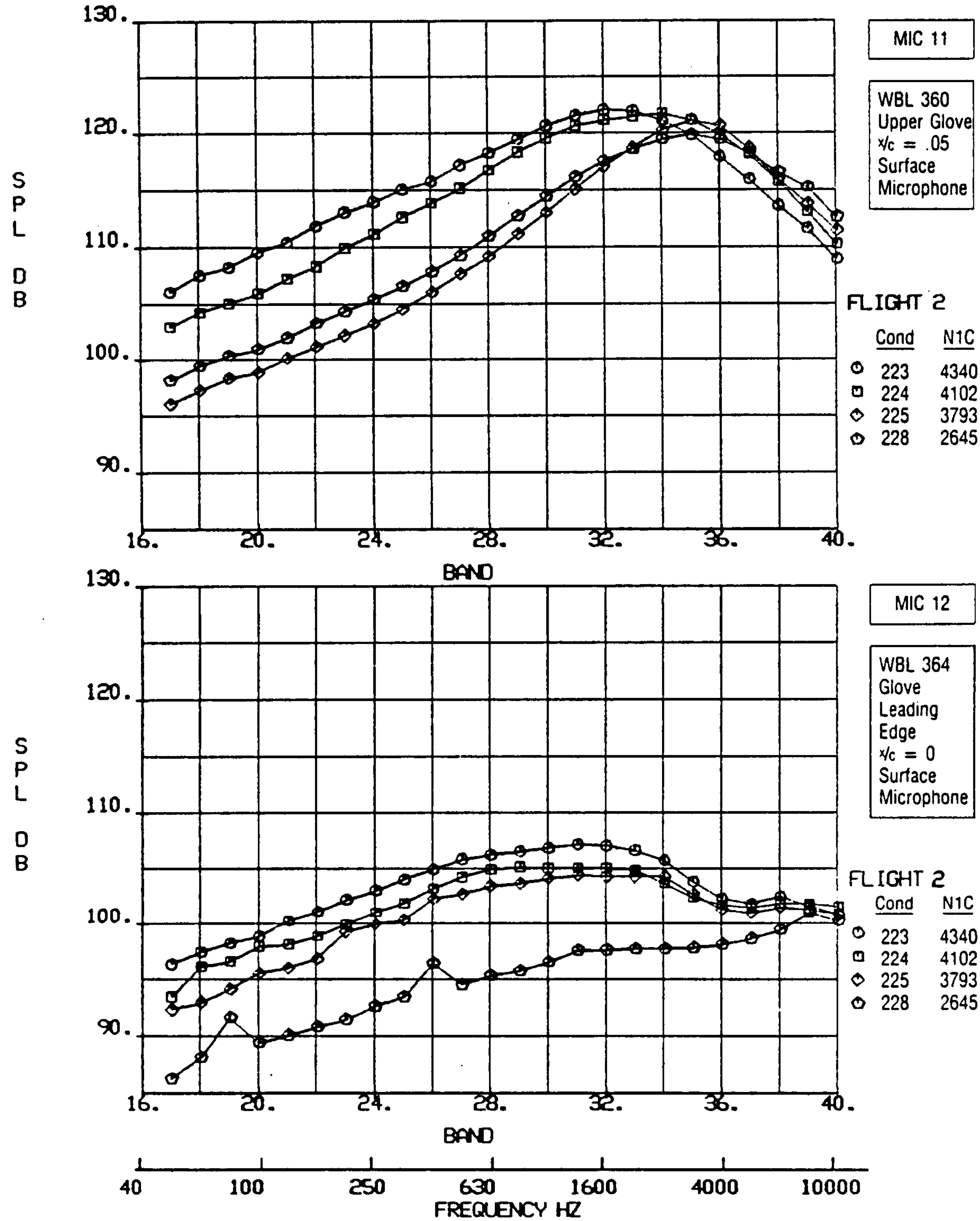

Figure 5-97. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

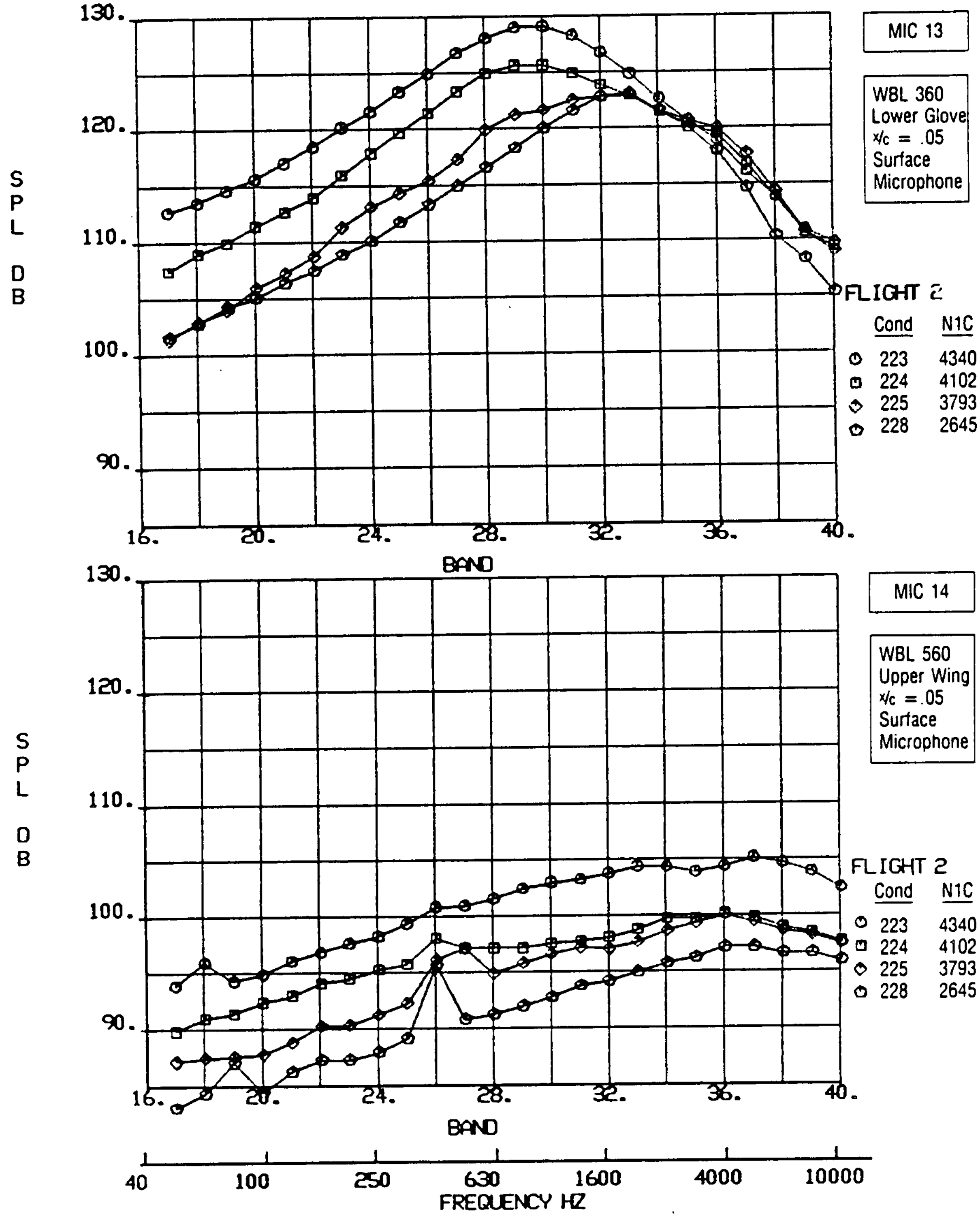

Figure 5-98. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

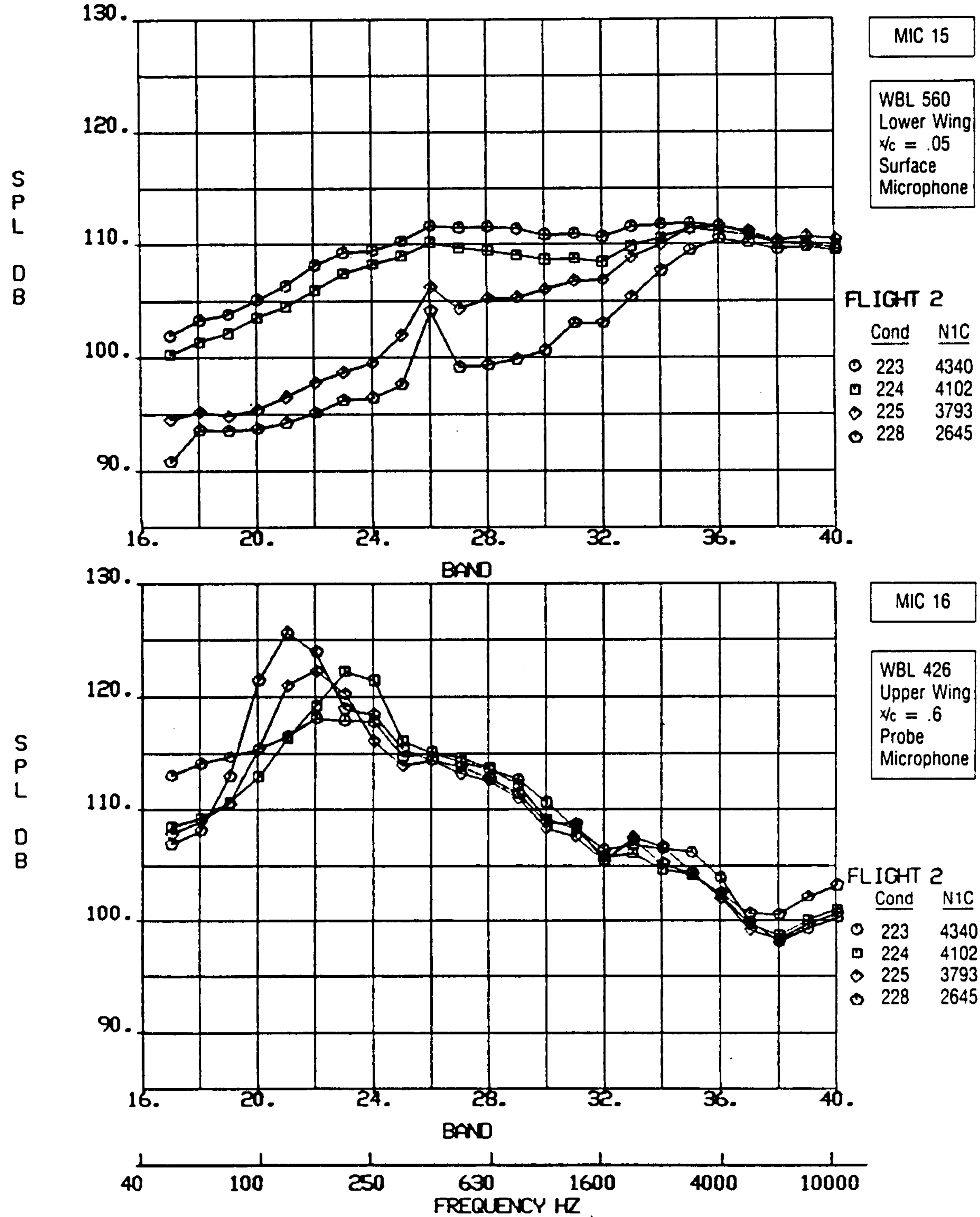

Figure 5-99. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

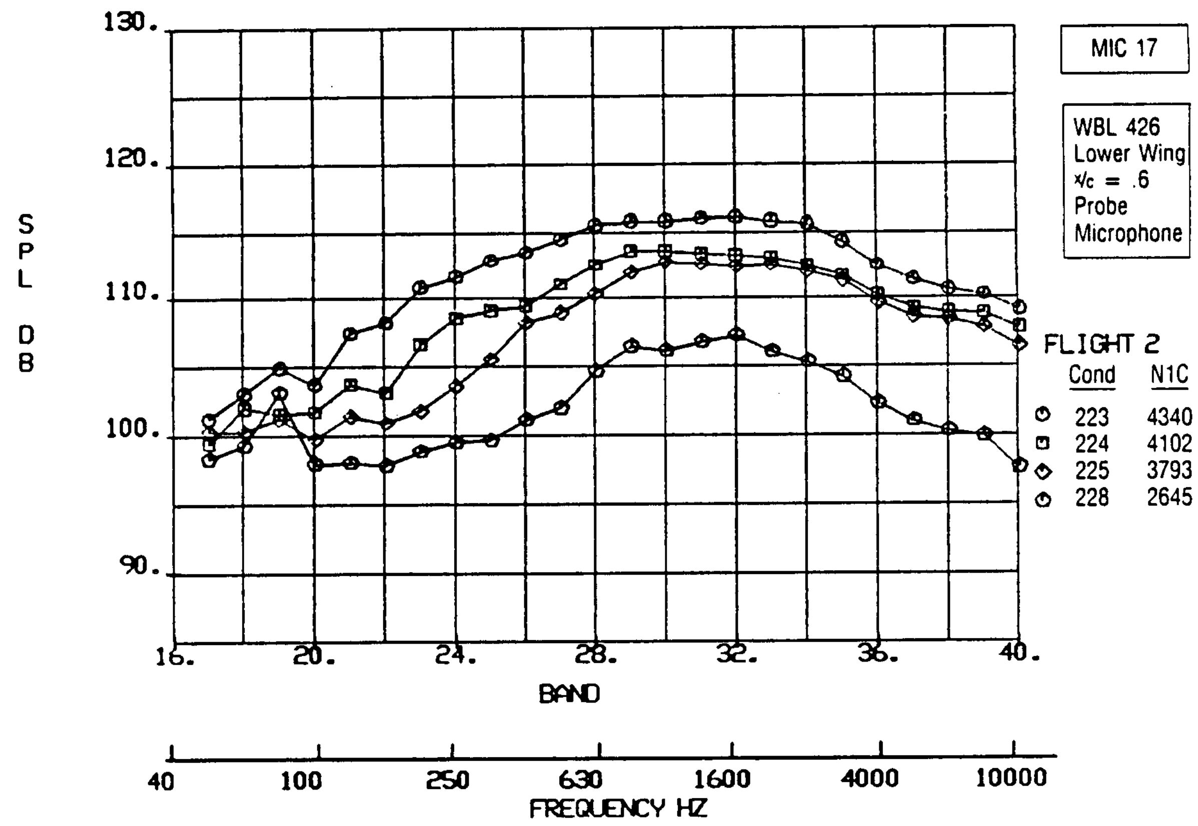

Figure 5-100. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

Narrowband analysis results are presented in Figures 5-101 through 5-109 for the Category 6, flight conditions from Flight 2.

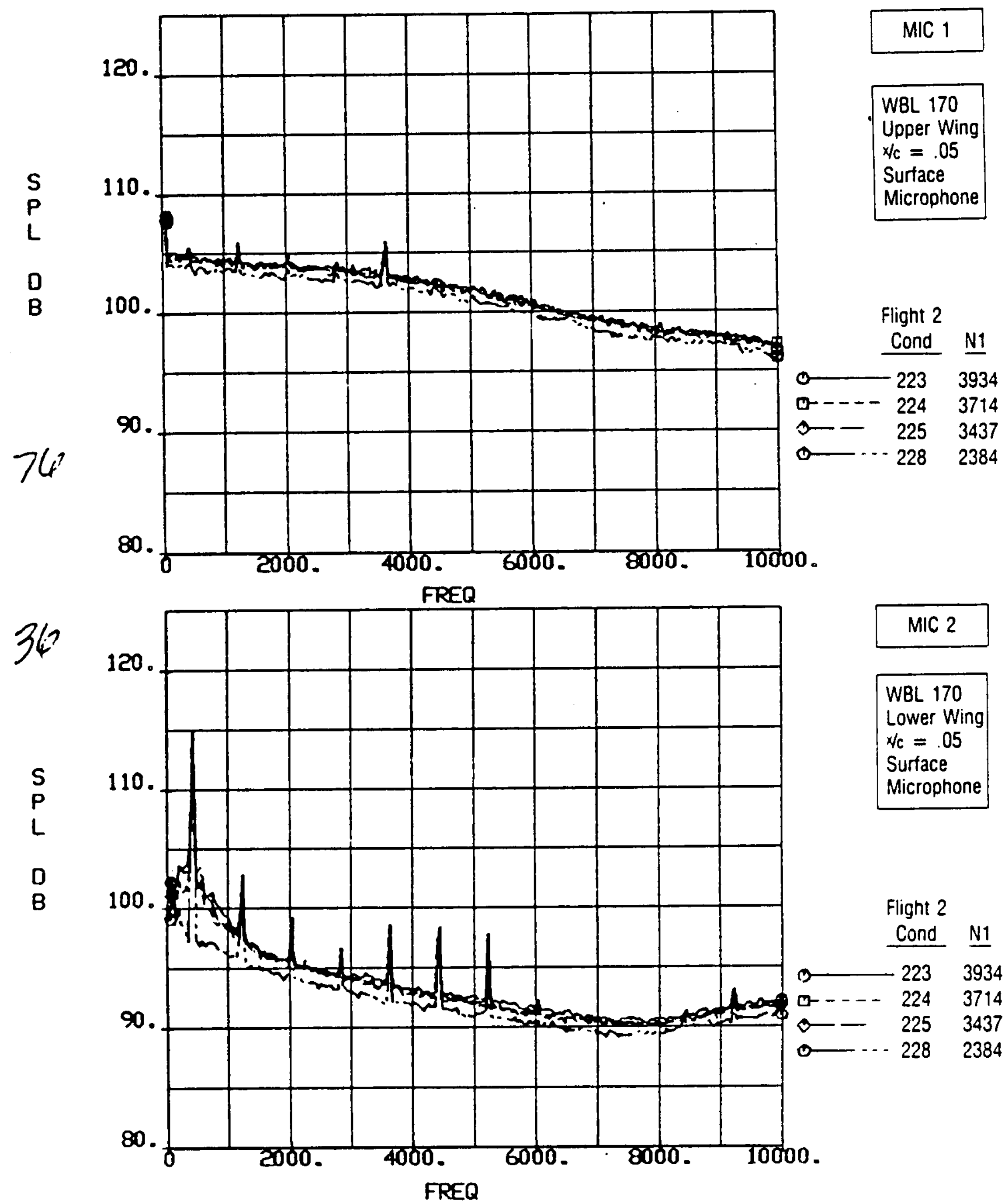

Figure 5-101. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

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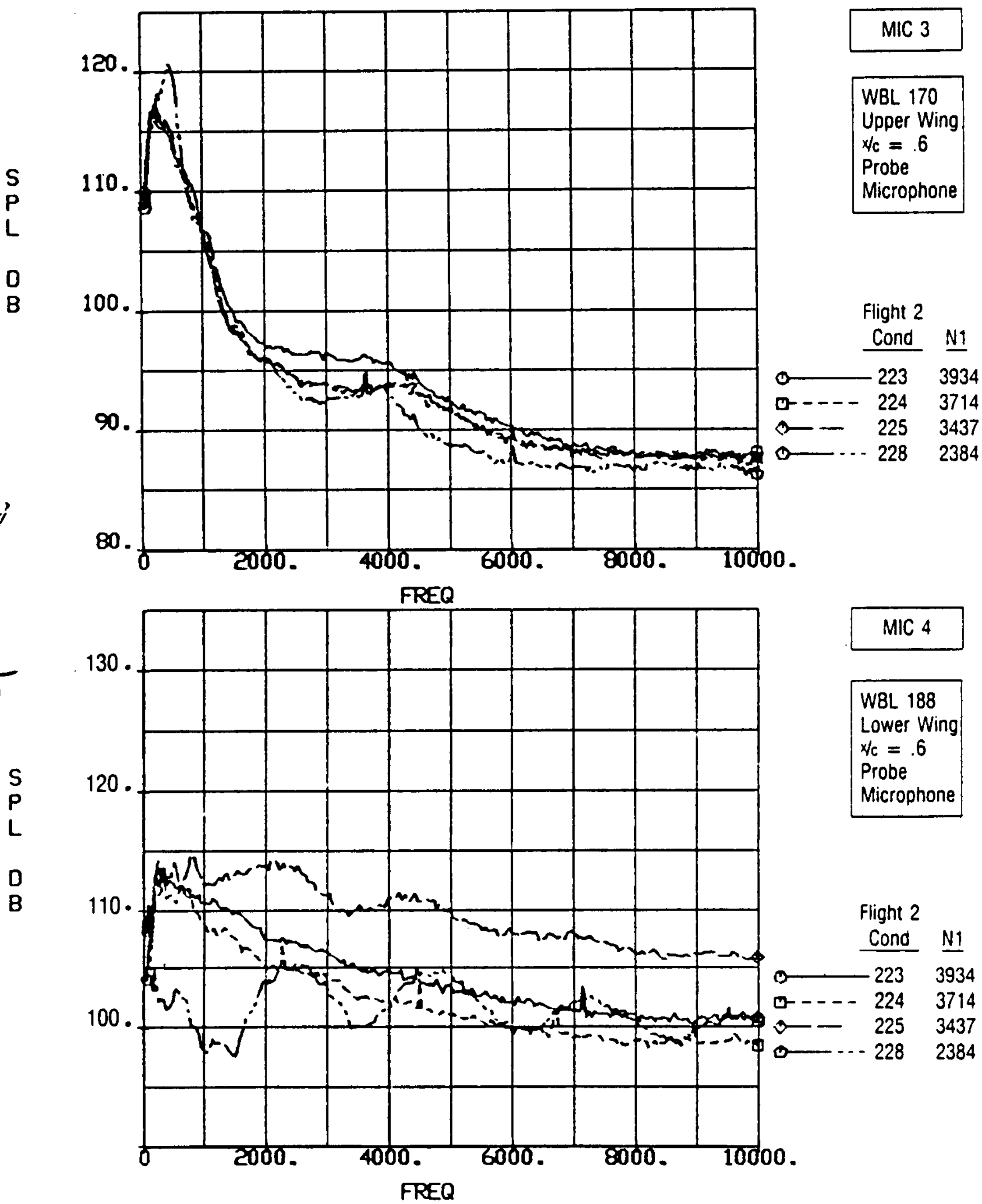
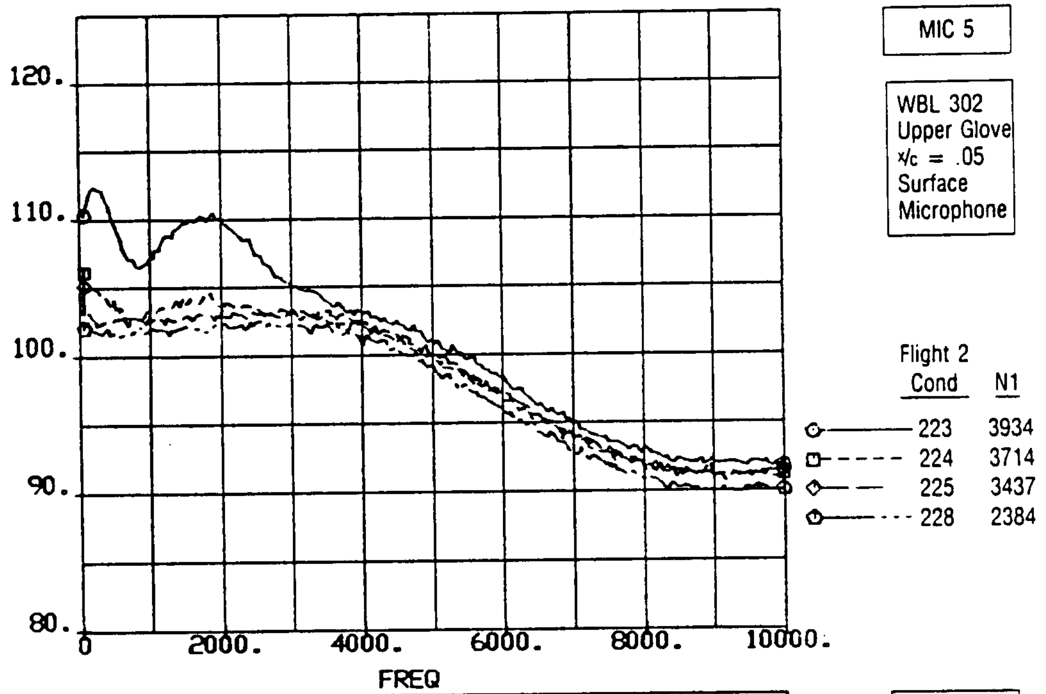


Figure 5-102. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80



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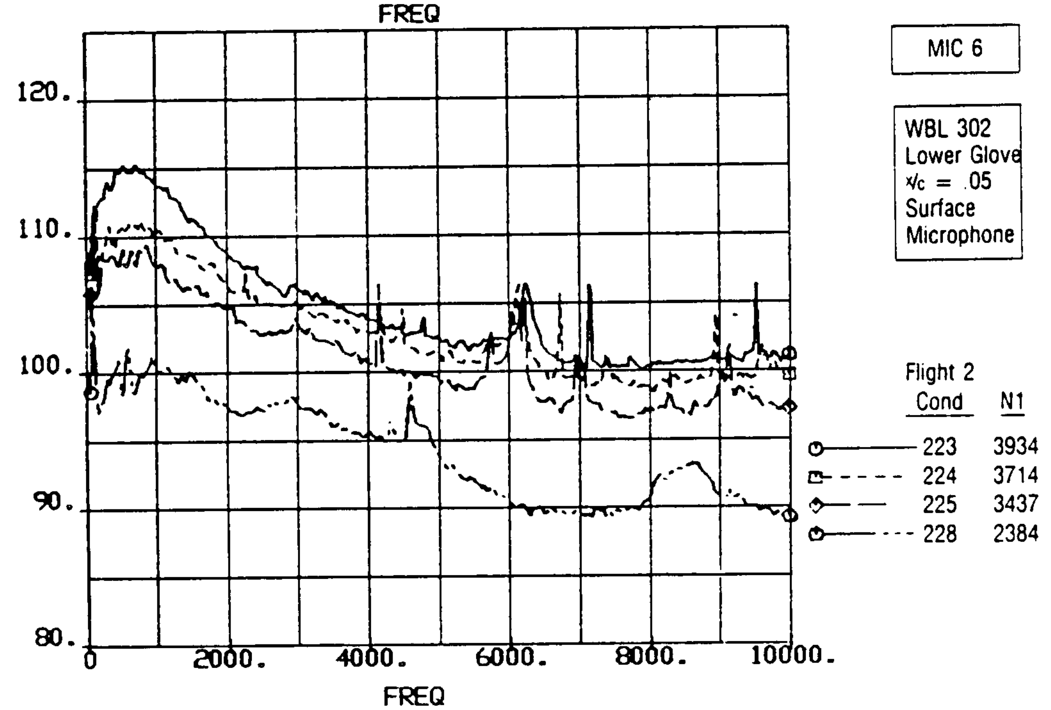

Figure 5-103. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

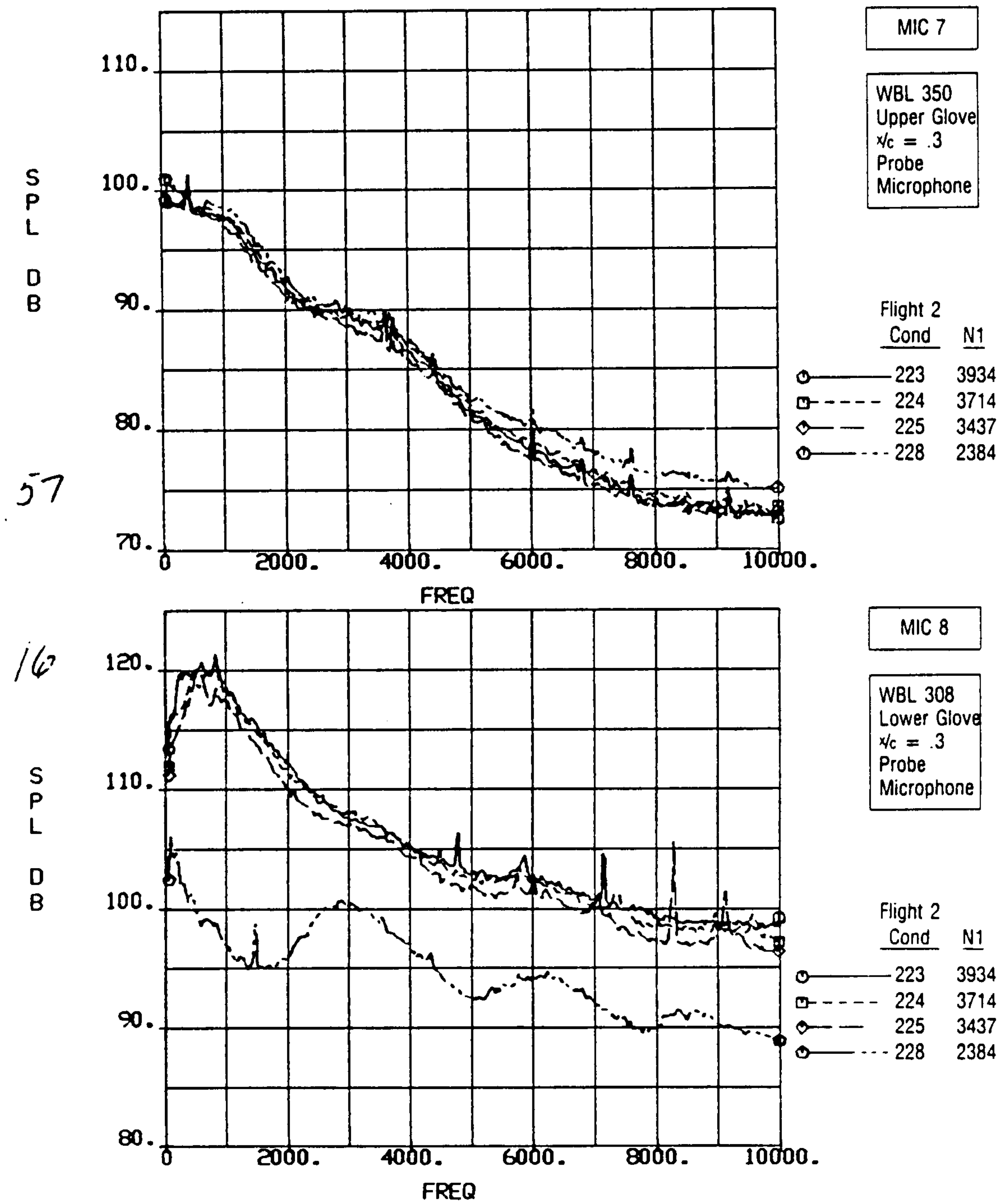

Figure 5-104. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

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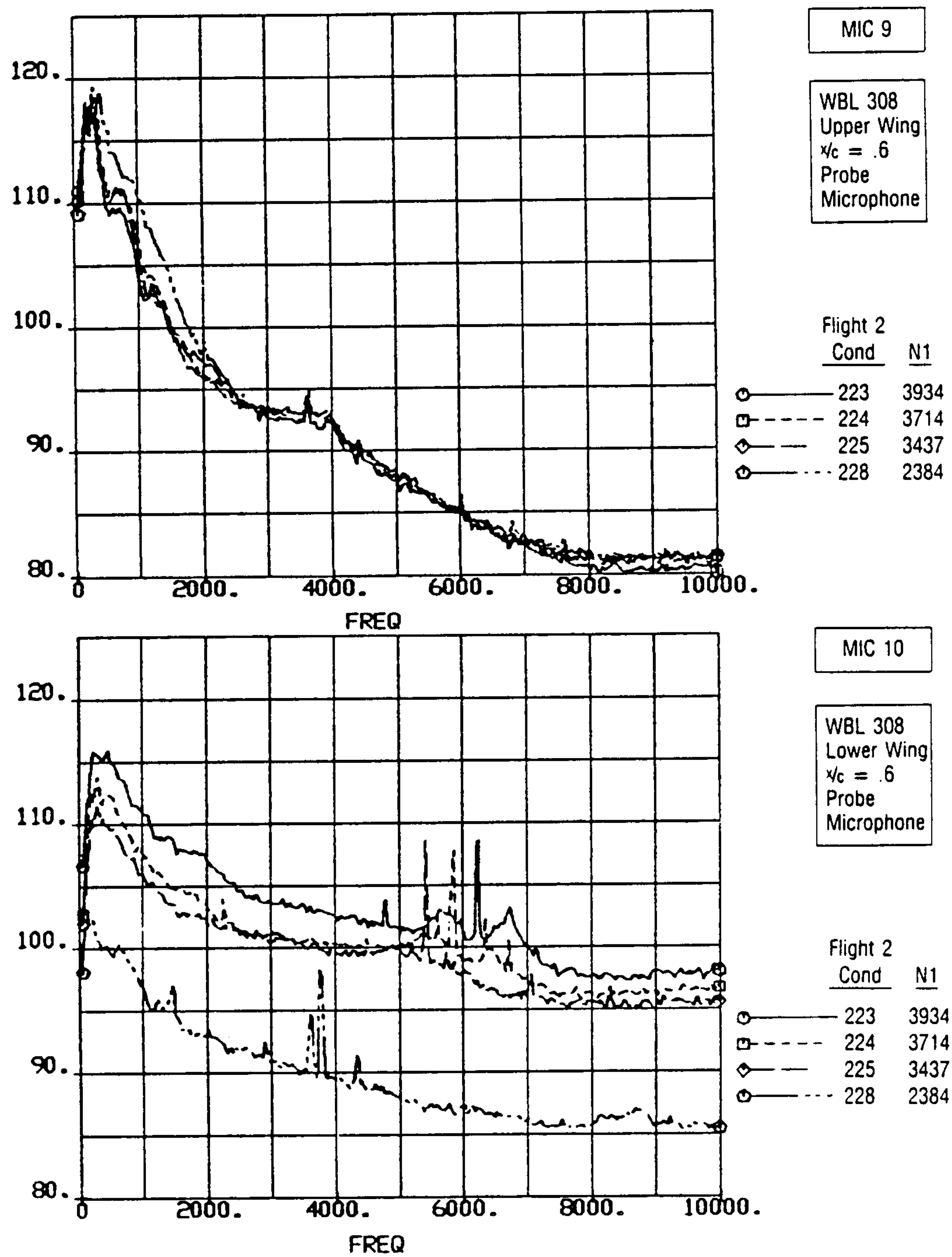

Figure 5-105. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

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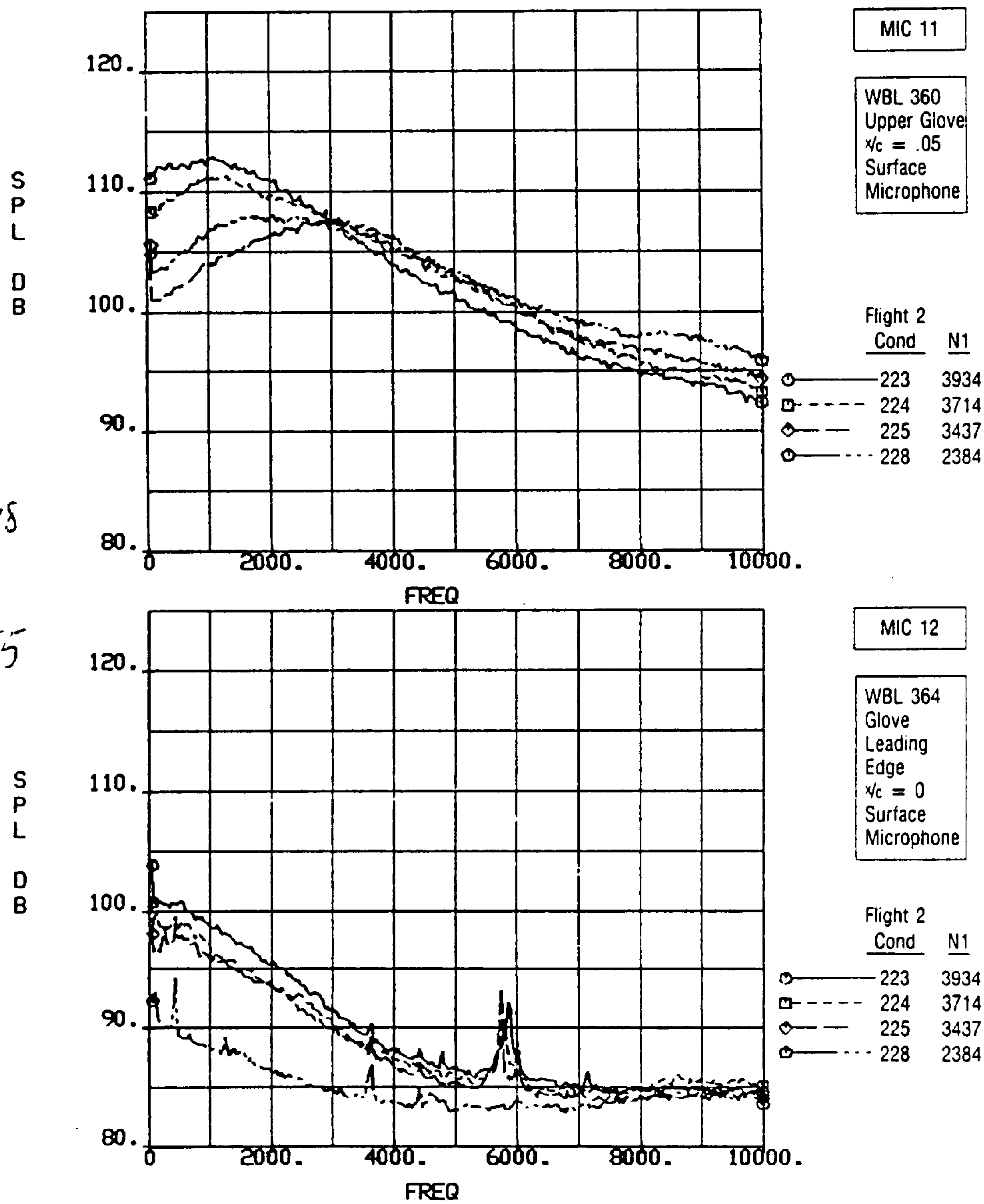


Figure 5-106. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

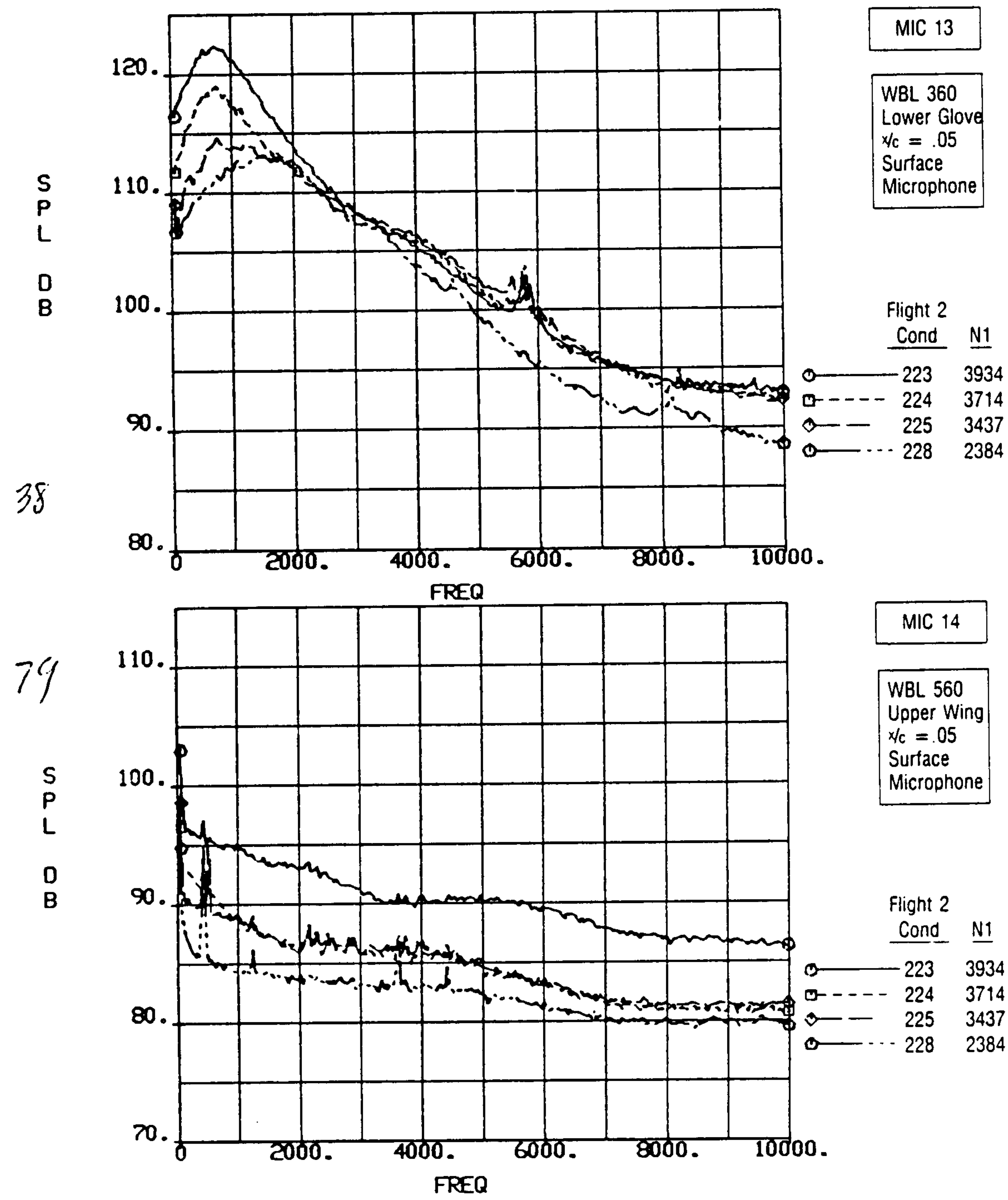
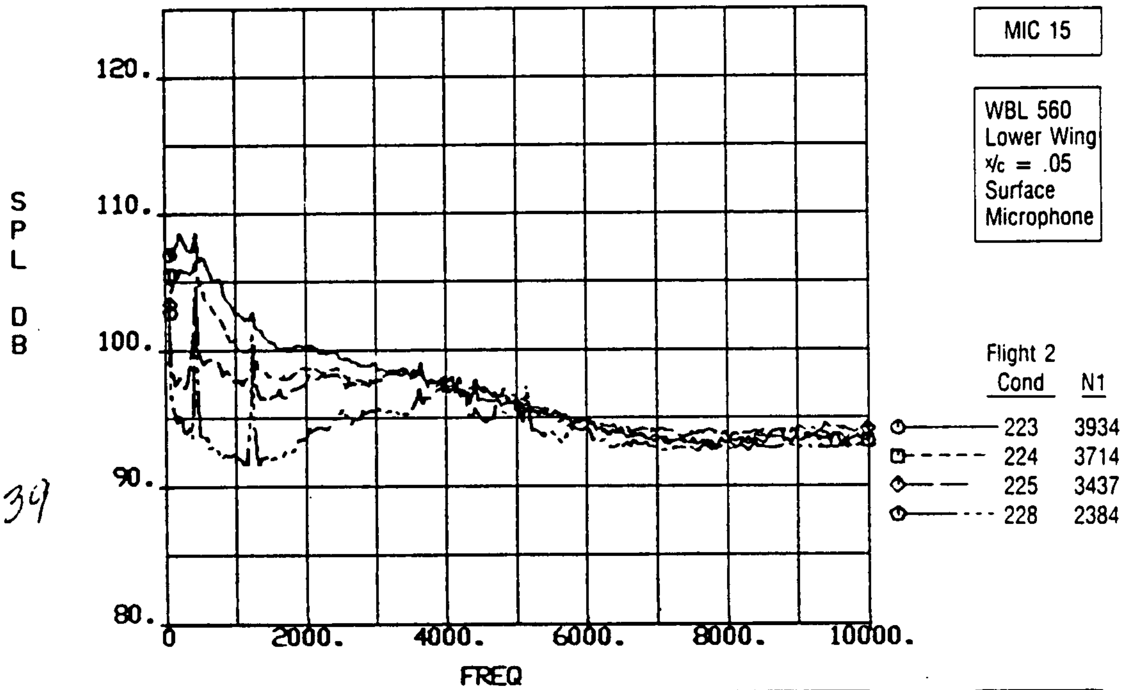


Figure 5-107. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80



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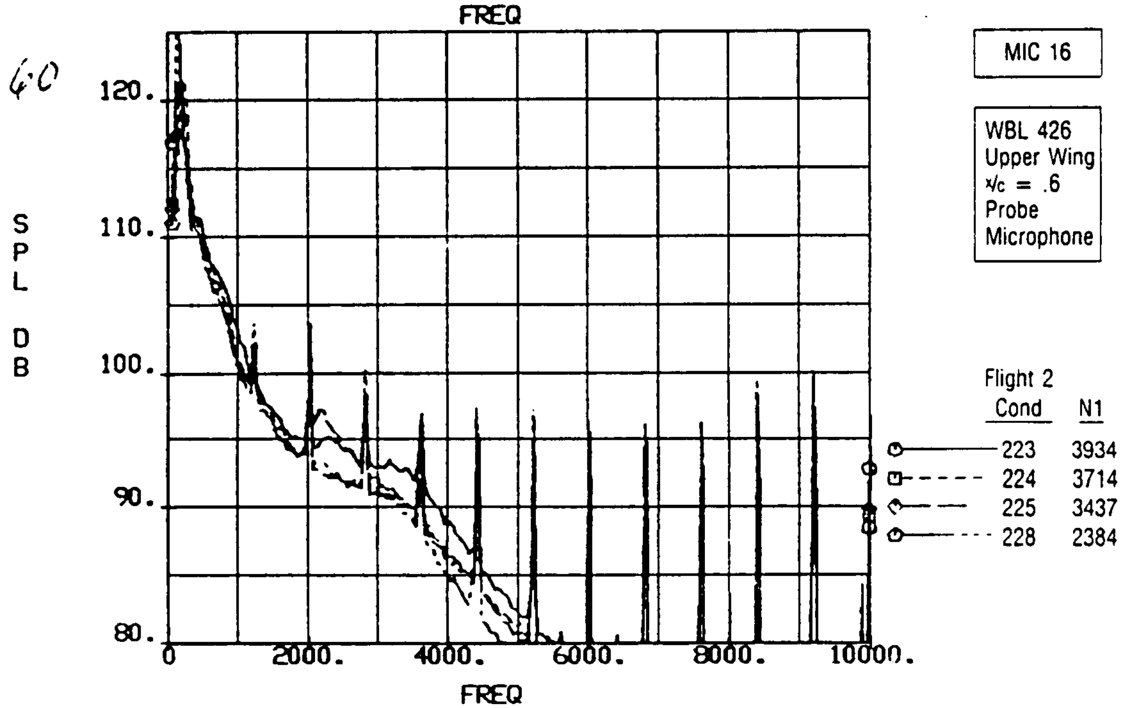

Figure 5-108. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

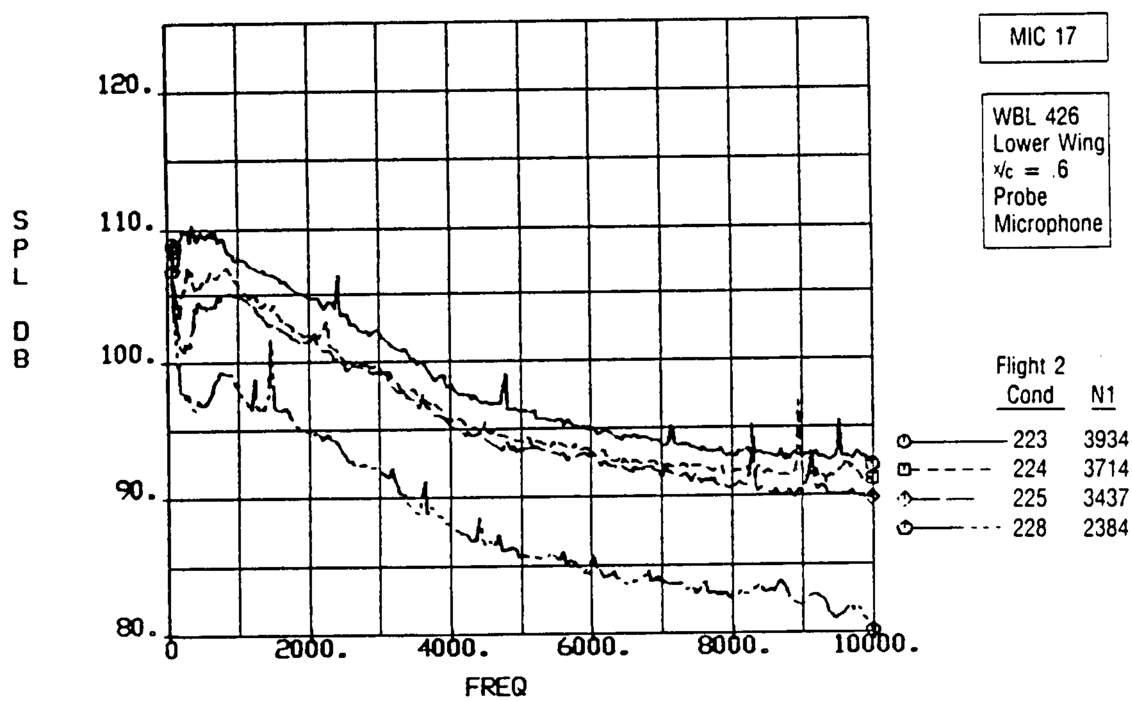

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Figure 5-109. 37.5 Hz Bandwidth SPL vs Frequency, Flight 2, Category 6, Engine Power Variation, M_{AP} = 0.80

Table 5-18. Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

Figures 5-110 through 5-118 present the one-third-octave band acoustic data for each microphone in Category 7 from Flight 2. Pertinent data corresponding to the Category 7, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
231	.70	39	4508	1.23	0
232	.70	39	4019	1.15	0
233	.70	39	3631	1.06	0
237	.71	39	3280	.99	0
236	.71	39	2602	.85	0
238	.69	36.5	1097	.70	0

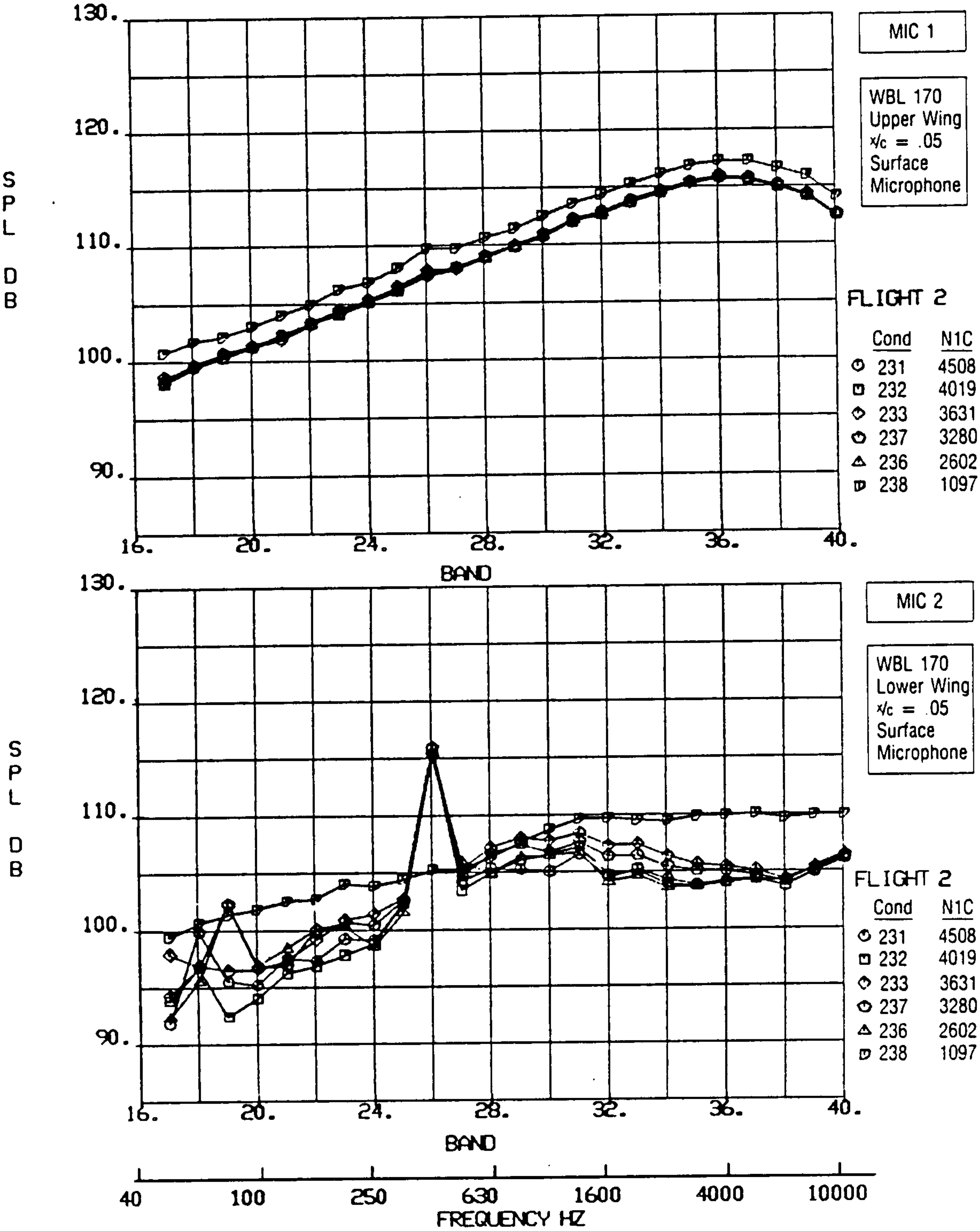


Figure 5-110. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

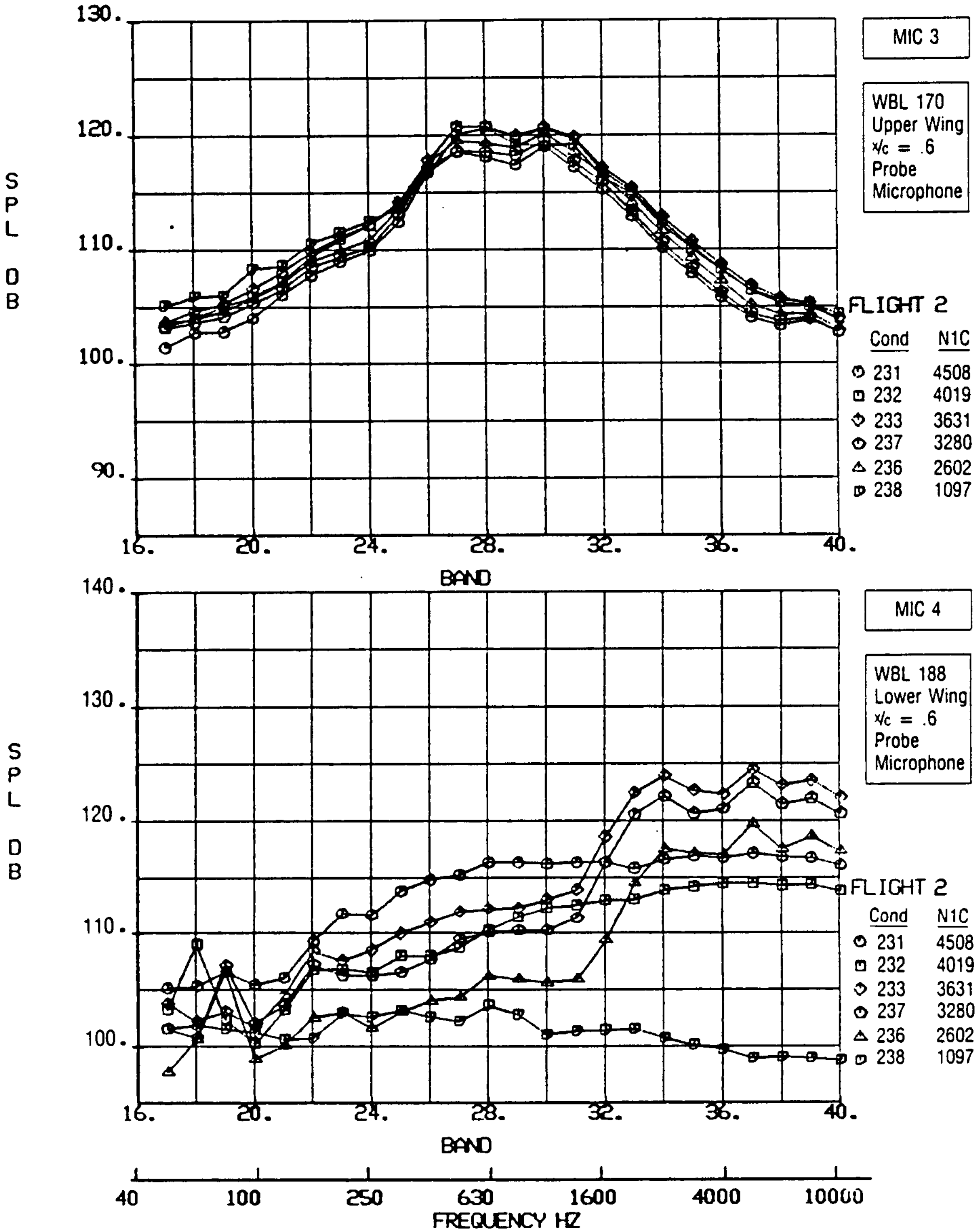


Figure 5-111. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

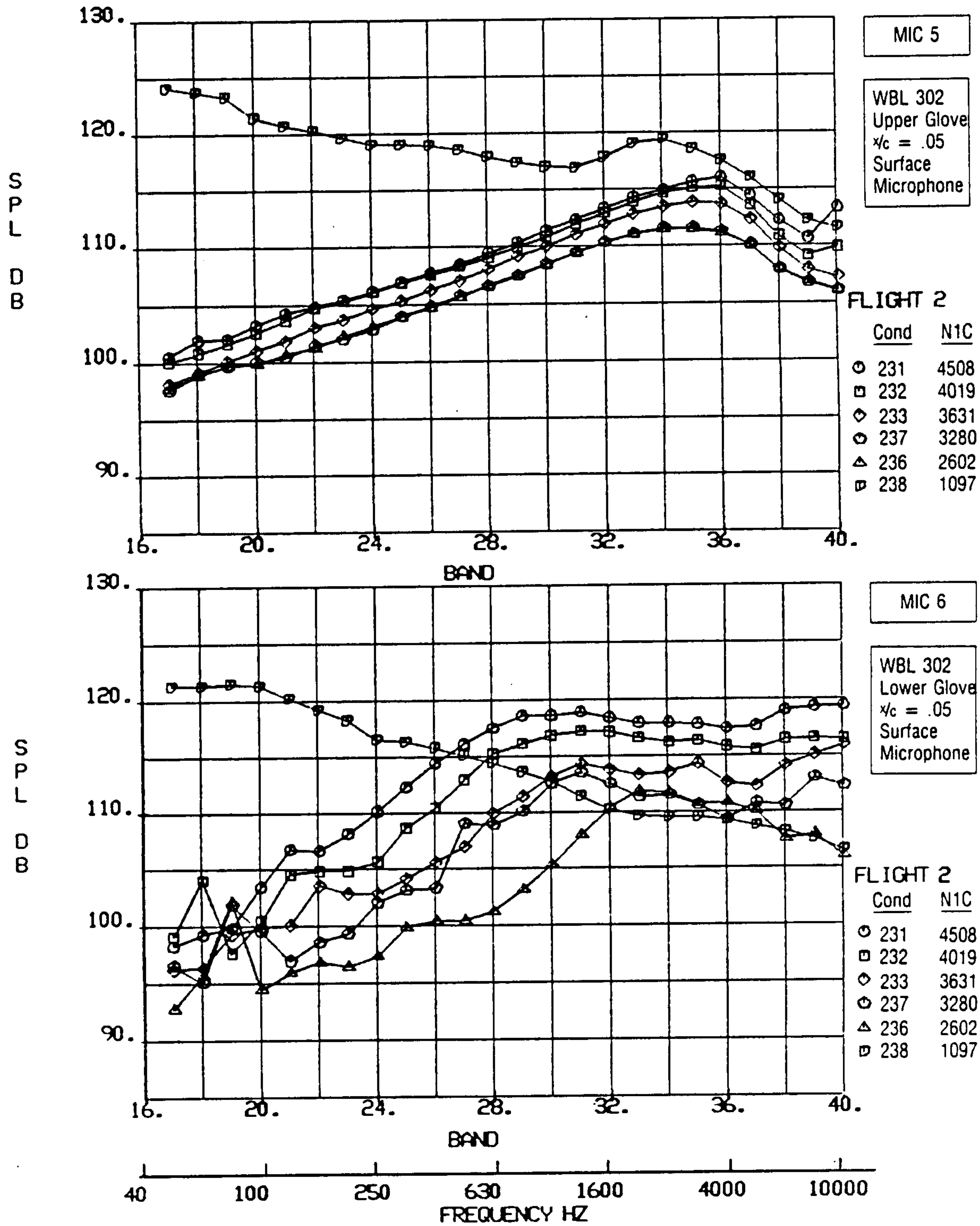


Figure 5-112. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

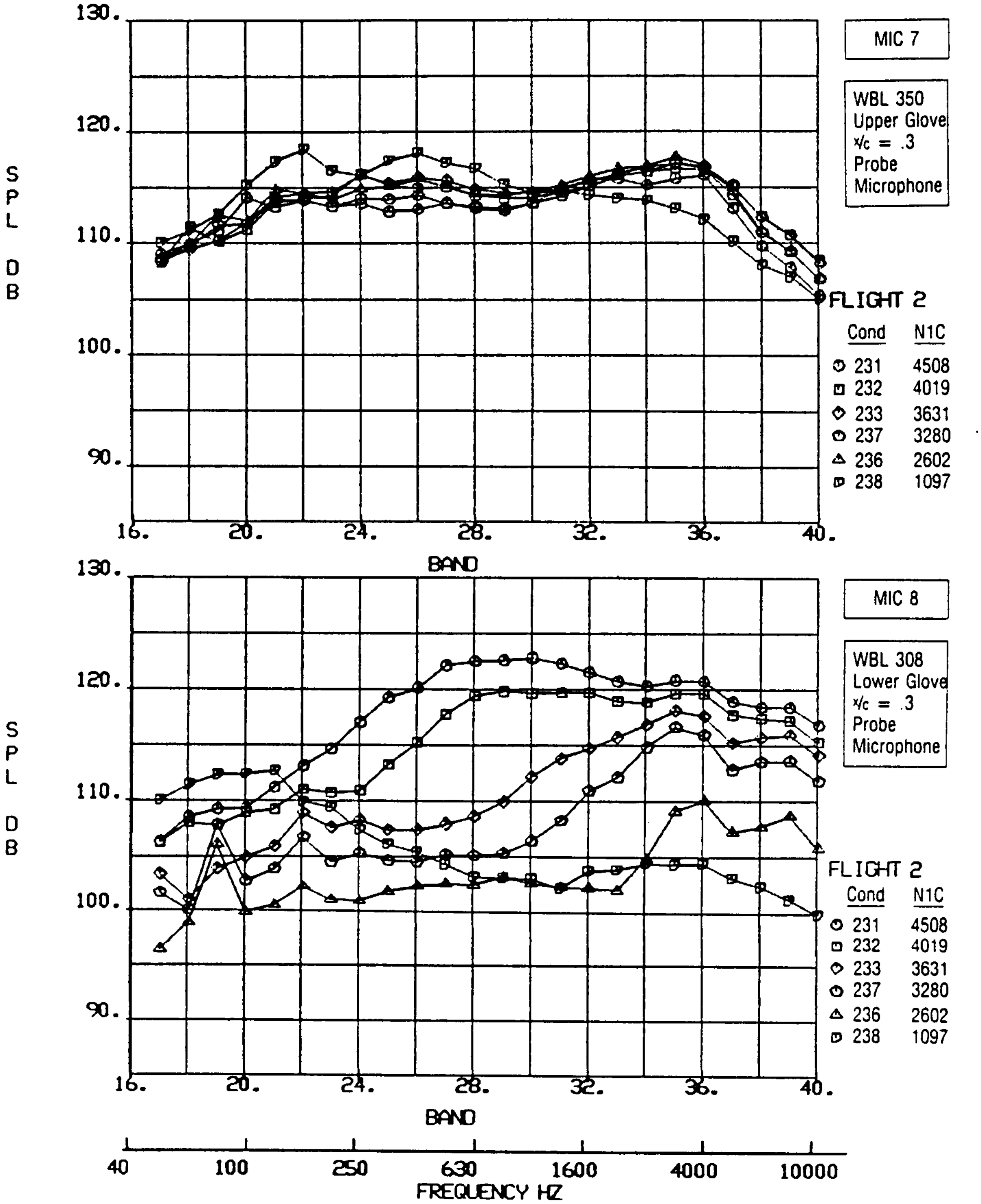


Figure 5-113. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

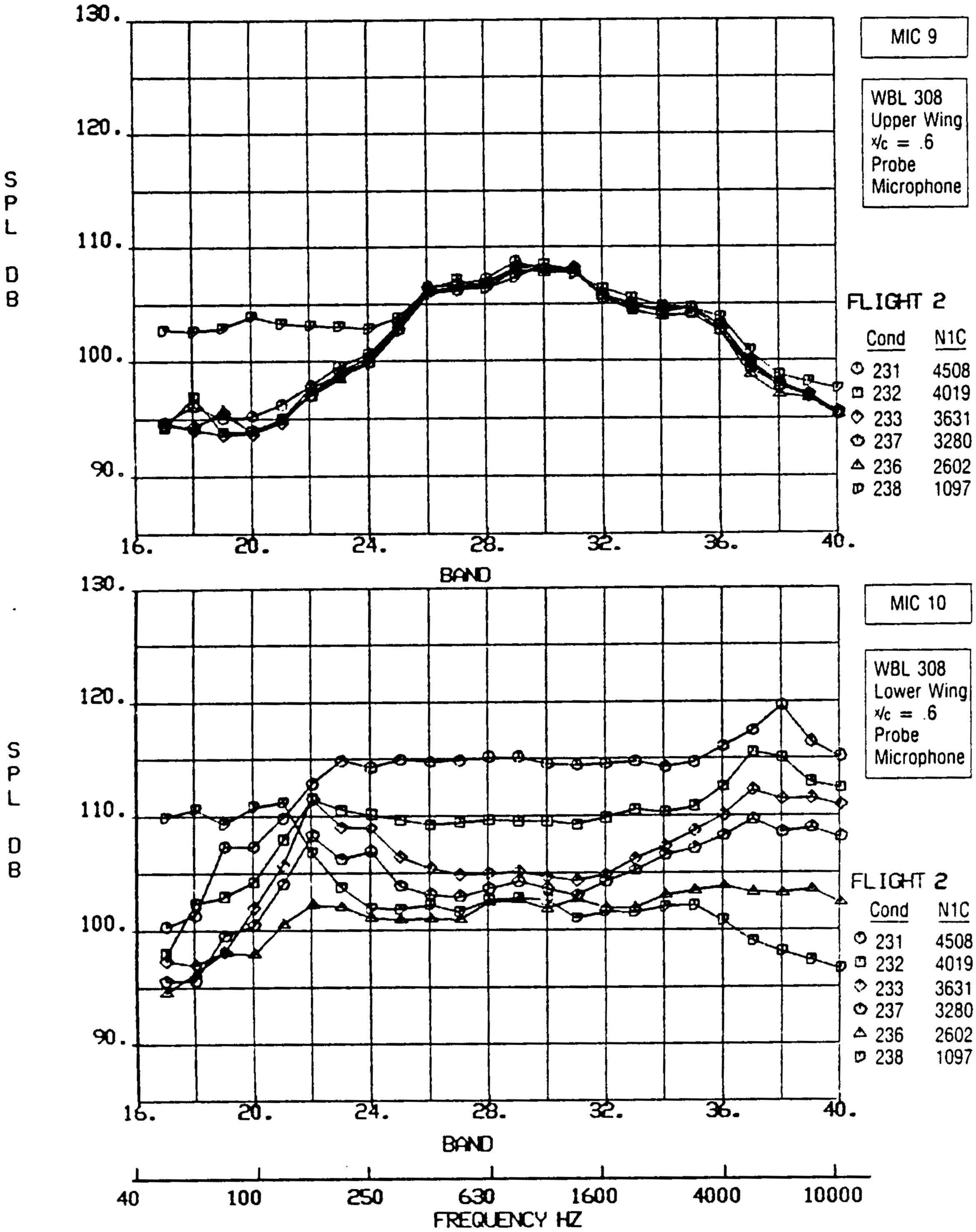


Figure 5-114. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

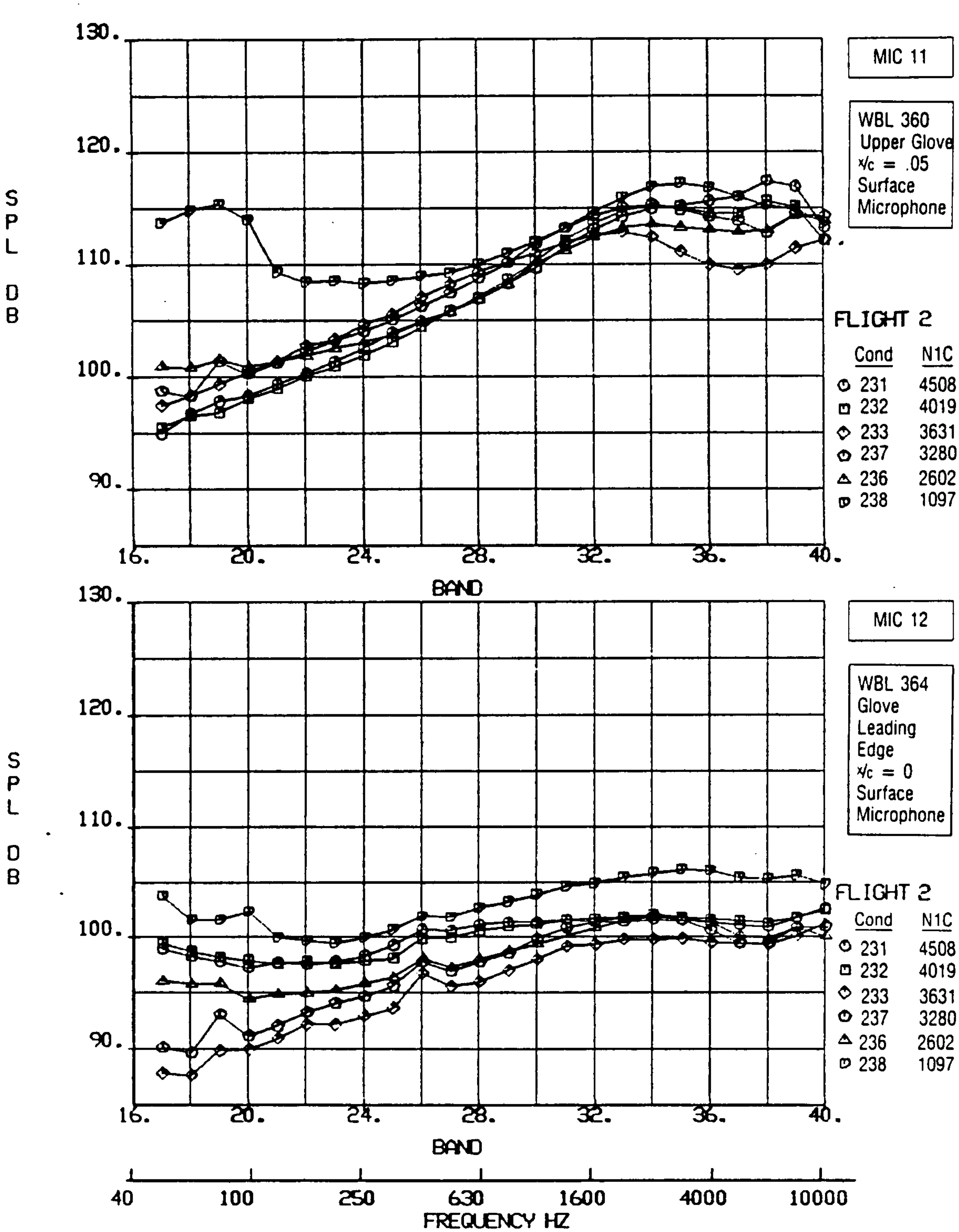


Figure 5-115. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

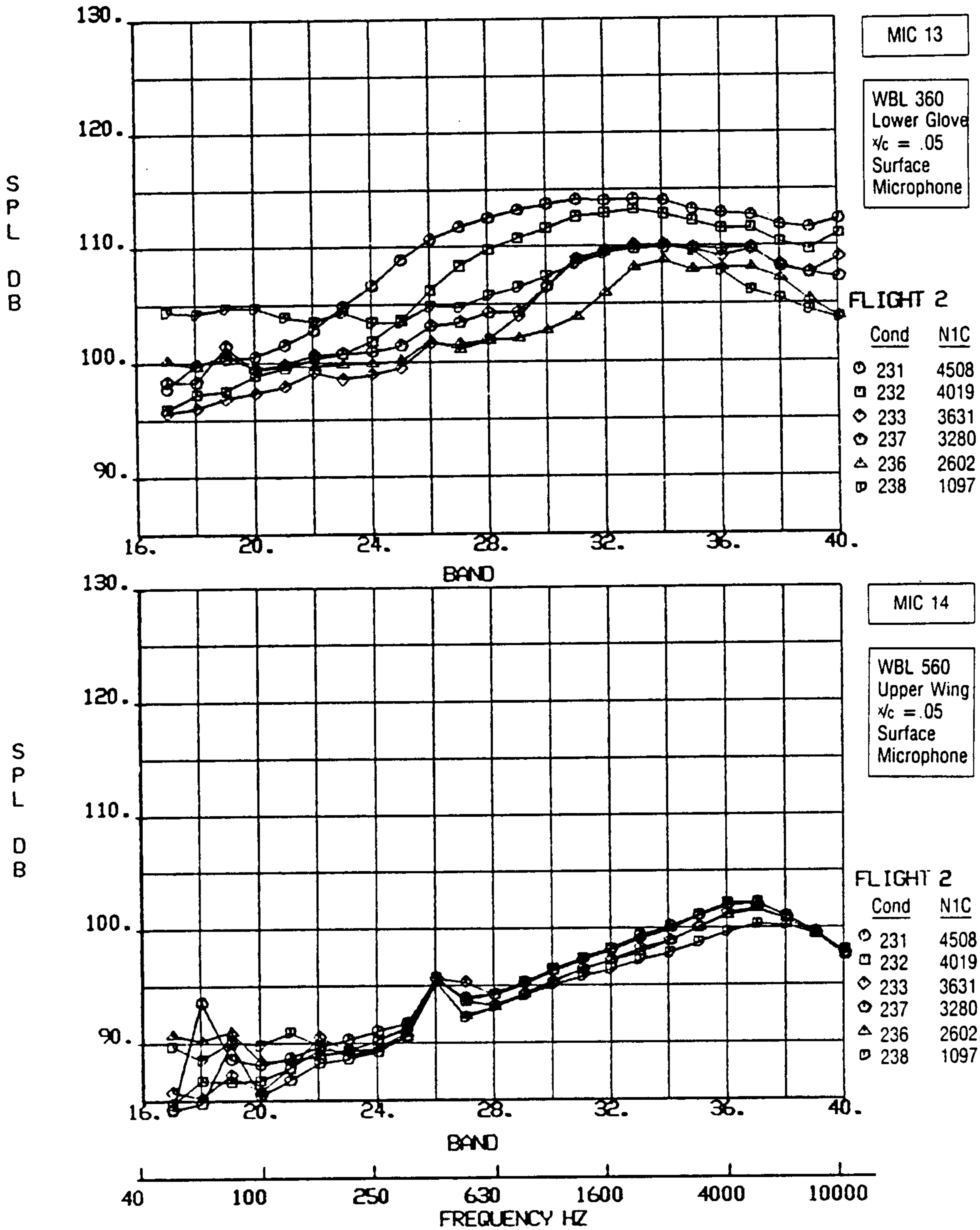


Figure 5-116. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

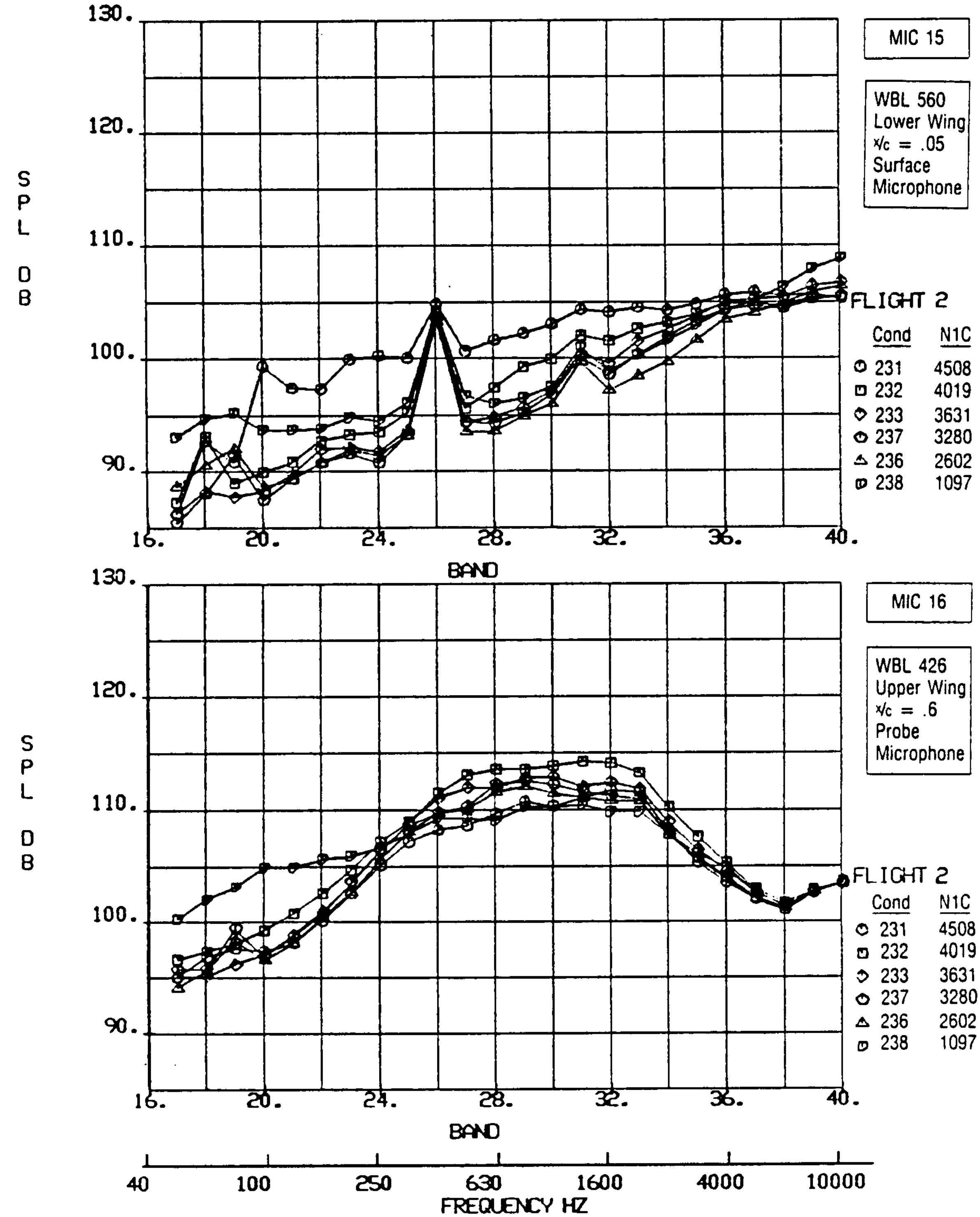


Figure 5-117. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

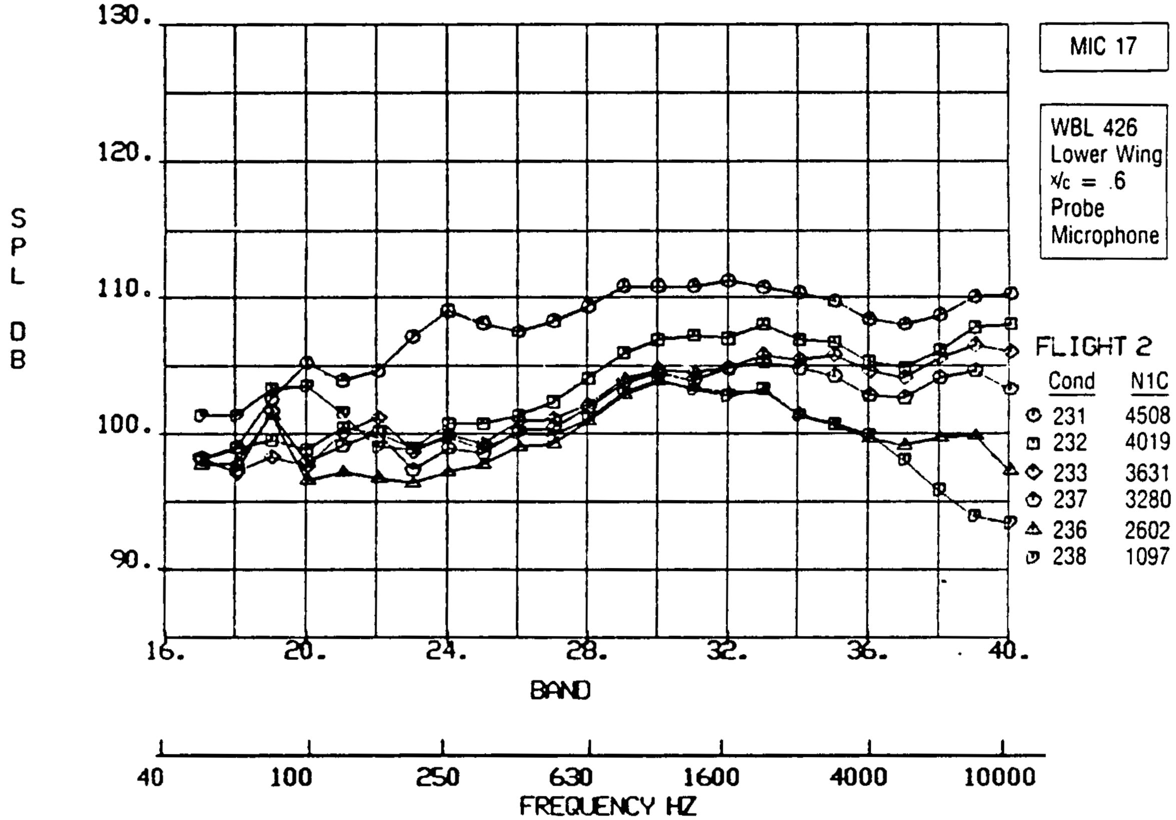


Figure 5-118. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 7, Engine Power Variation, M_{AP} = 0.70

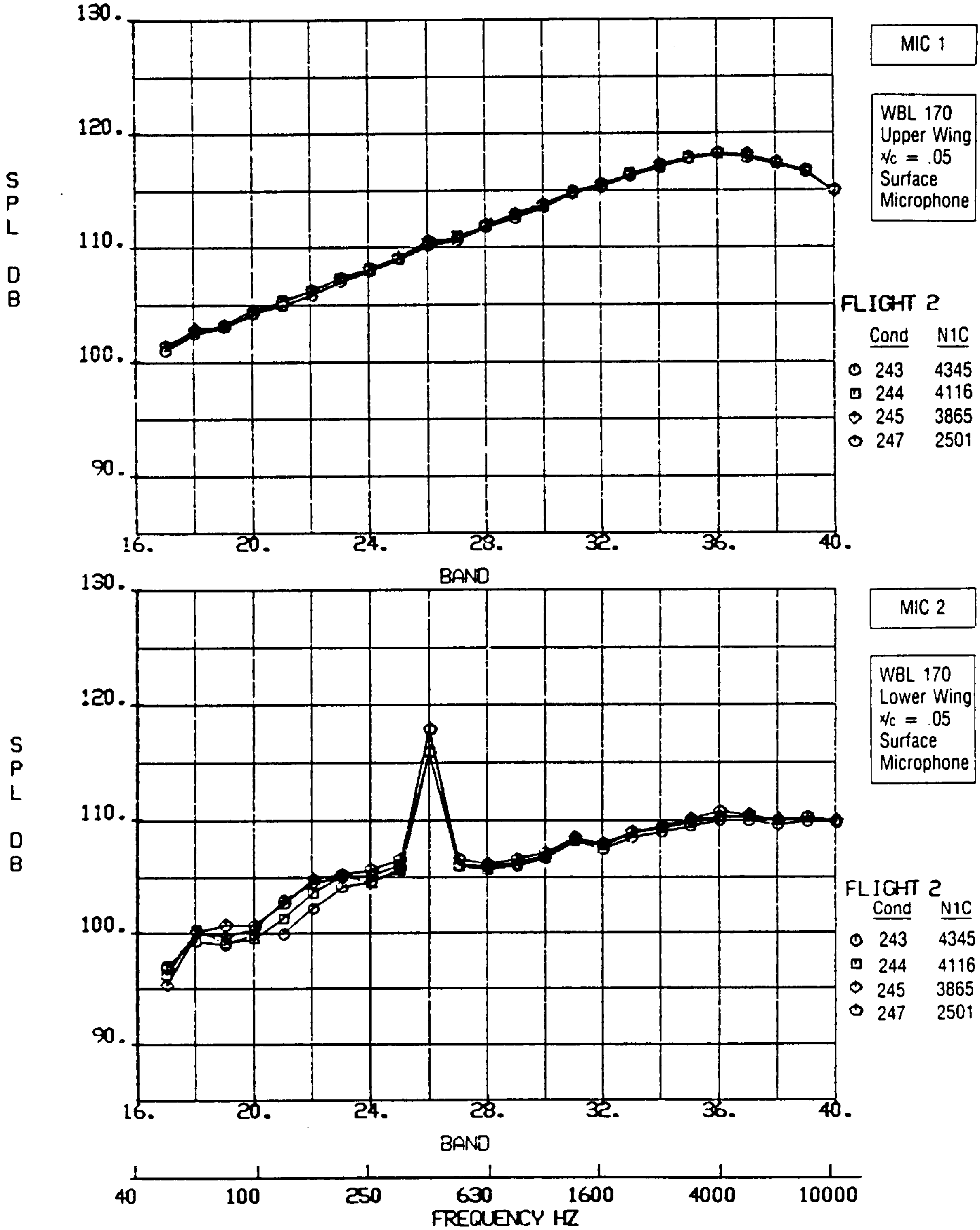


Figure 5-119. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

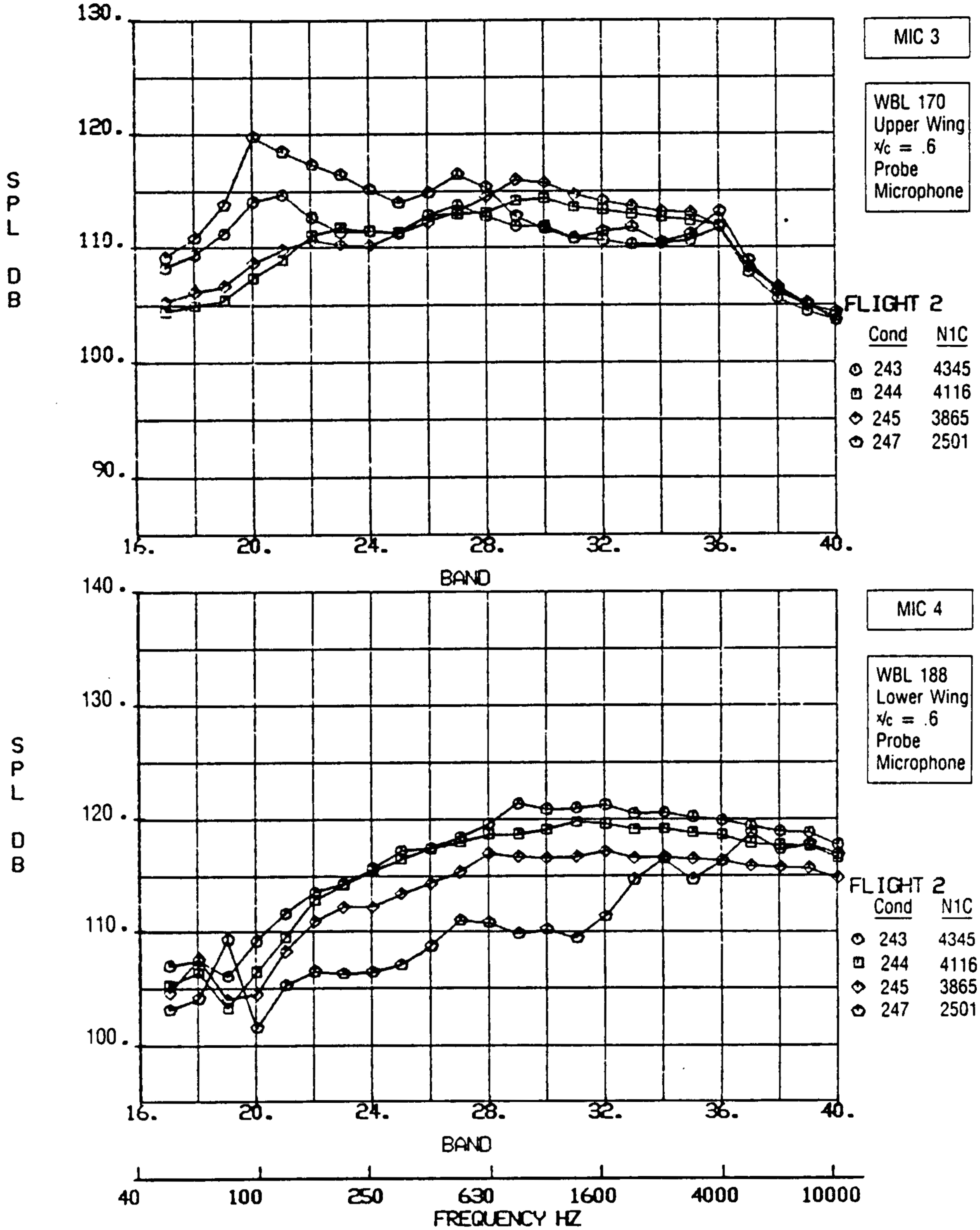


Figure 5-120. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

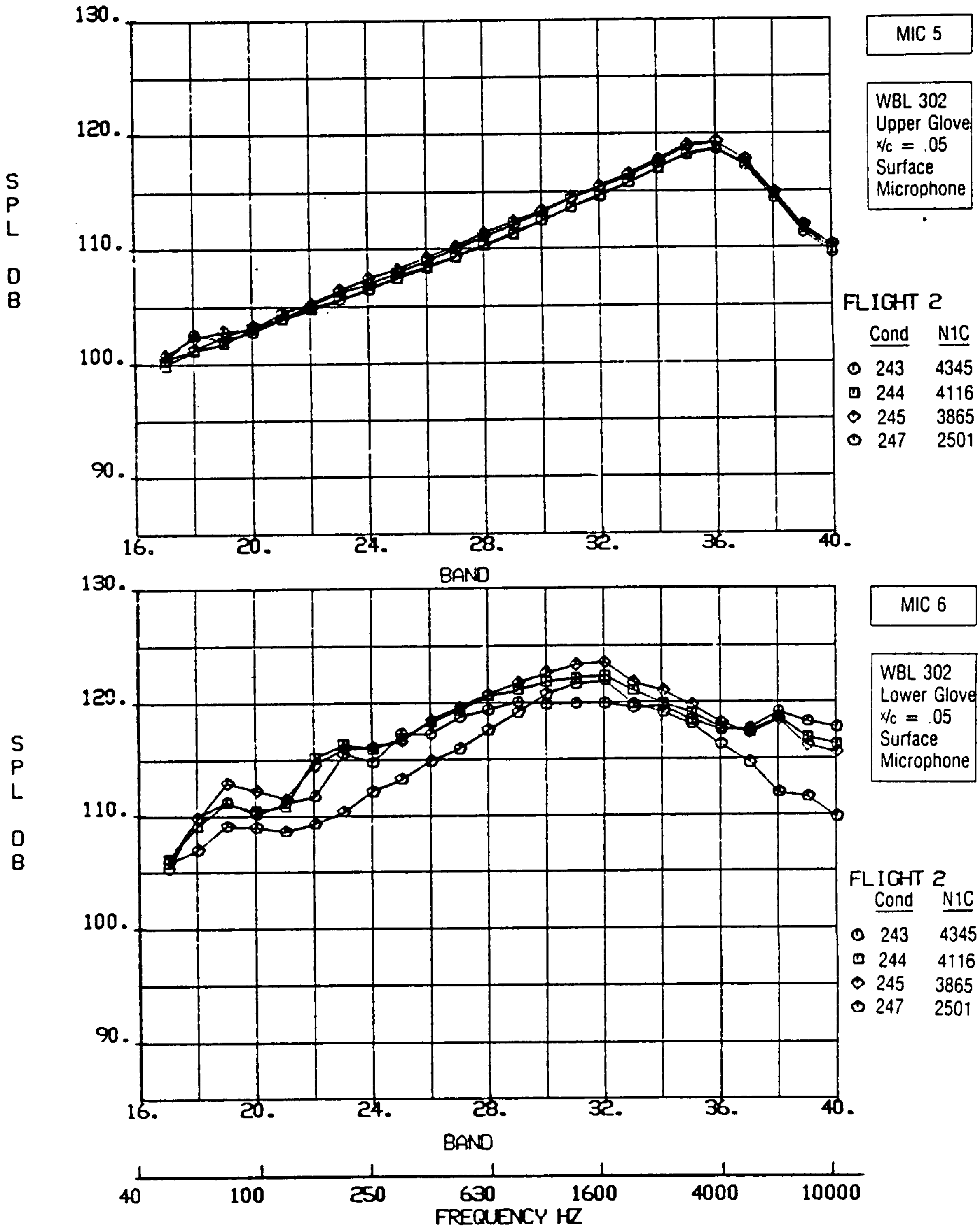


Figure 5-121. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

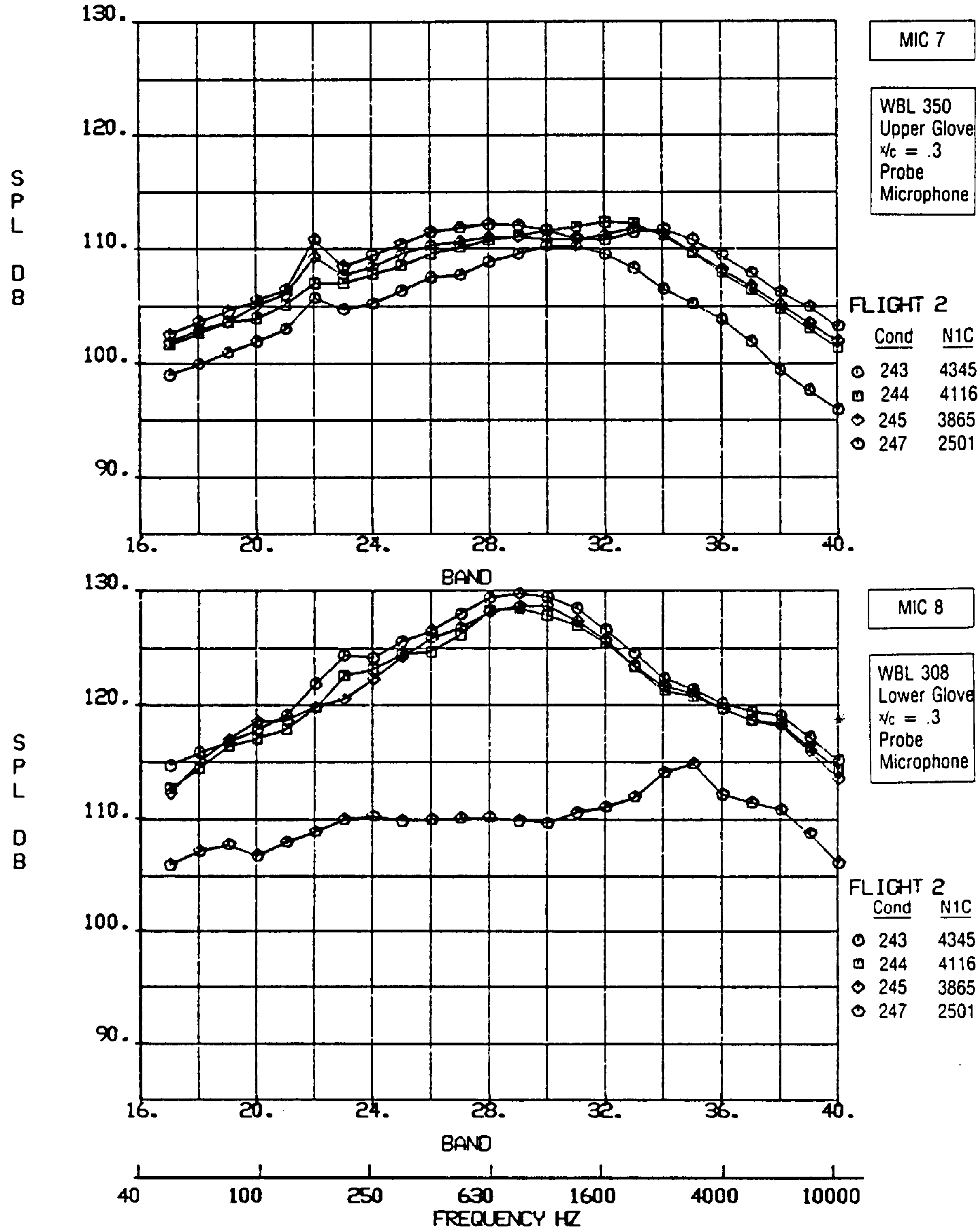


Figure 5-122. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

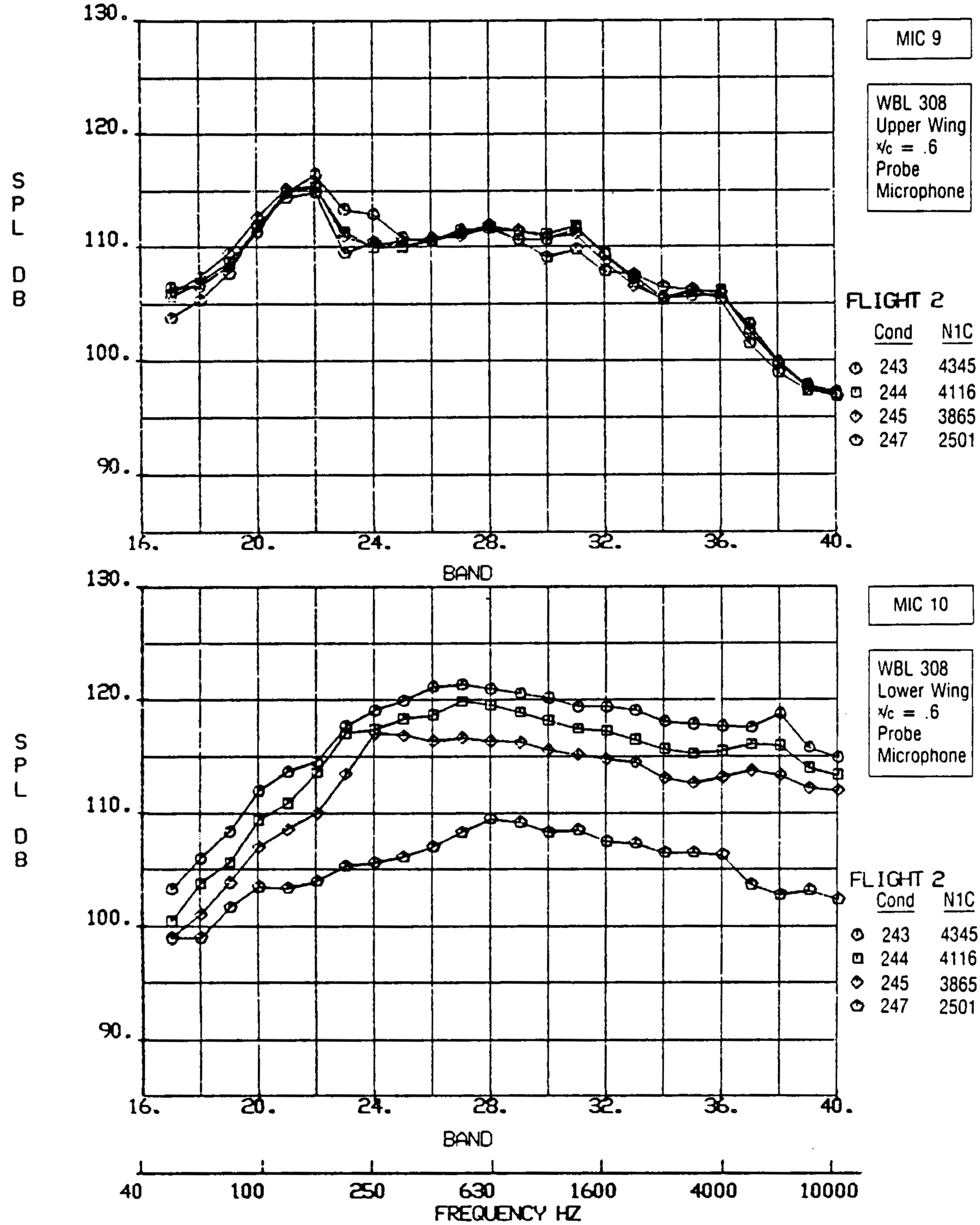


Figure 5-123. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

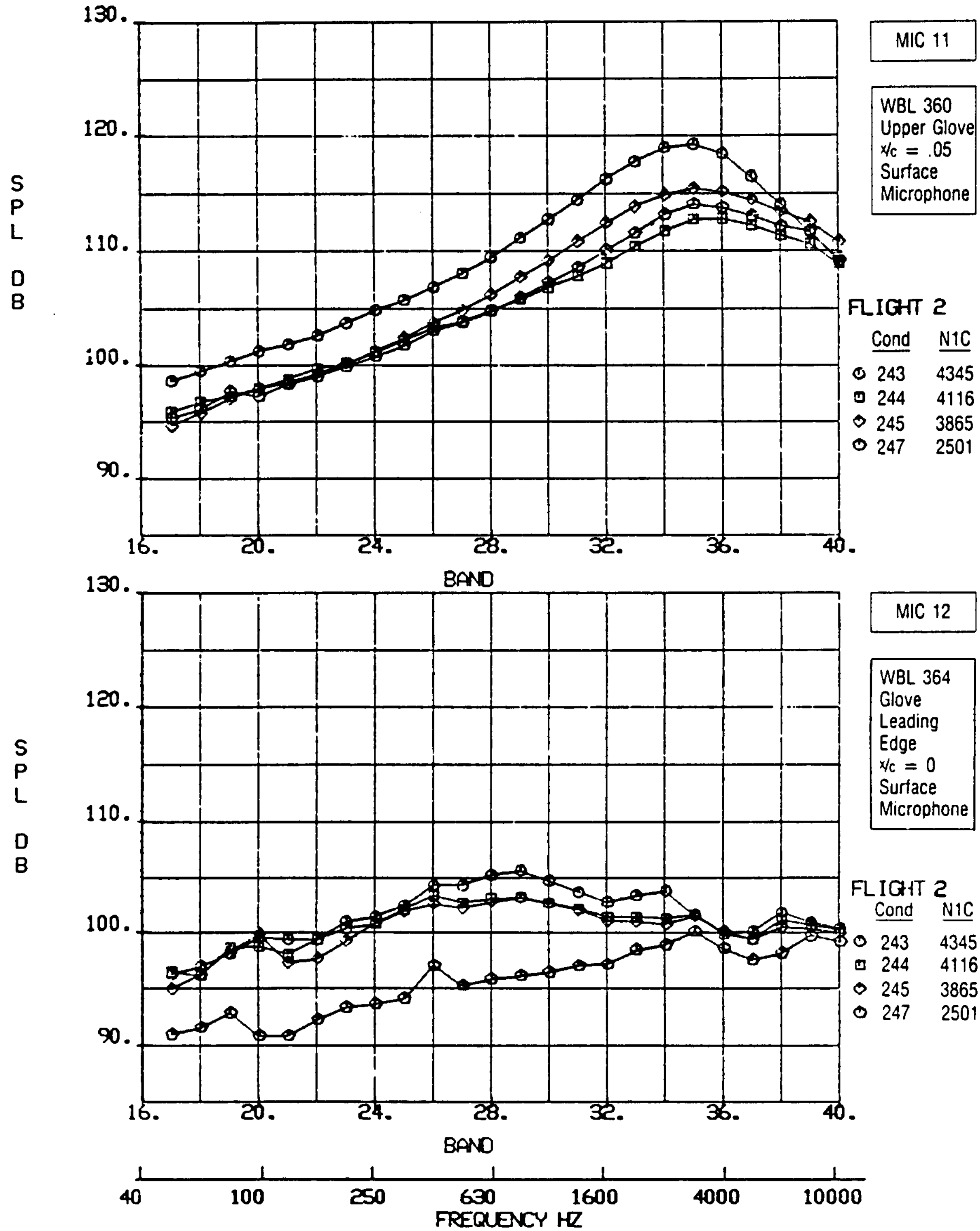


Figure 5-124. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

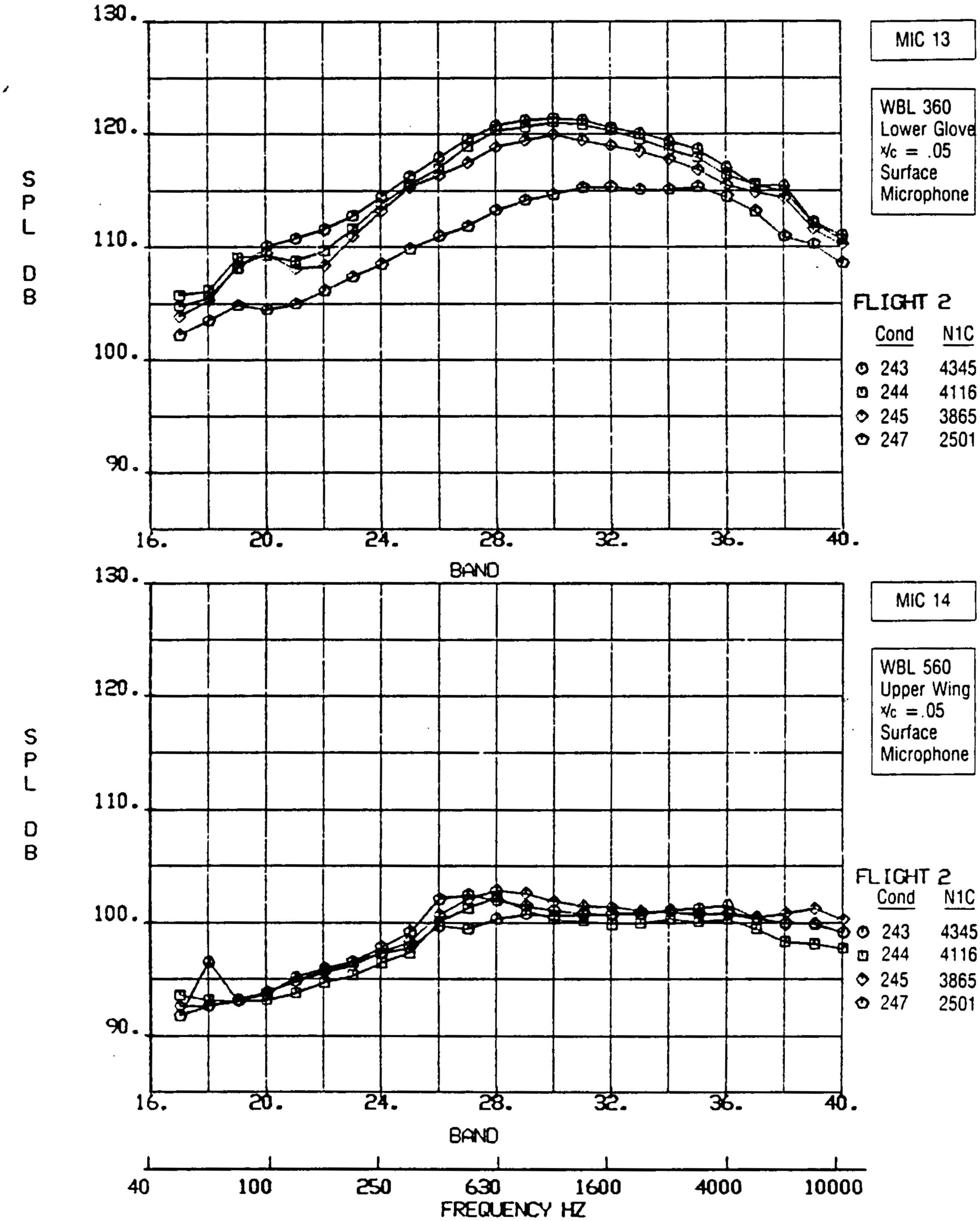


Figure 5-125. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

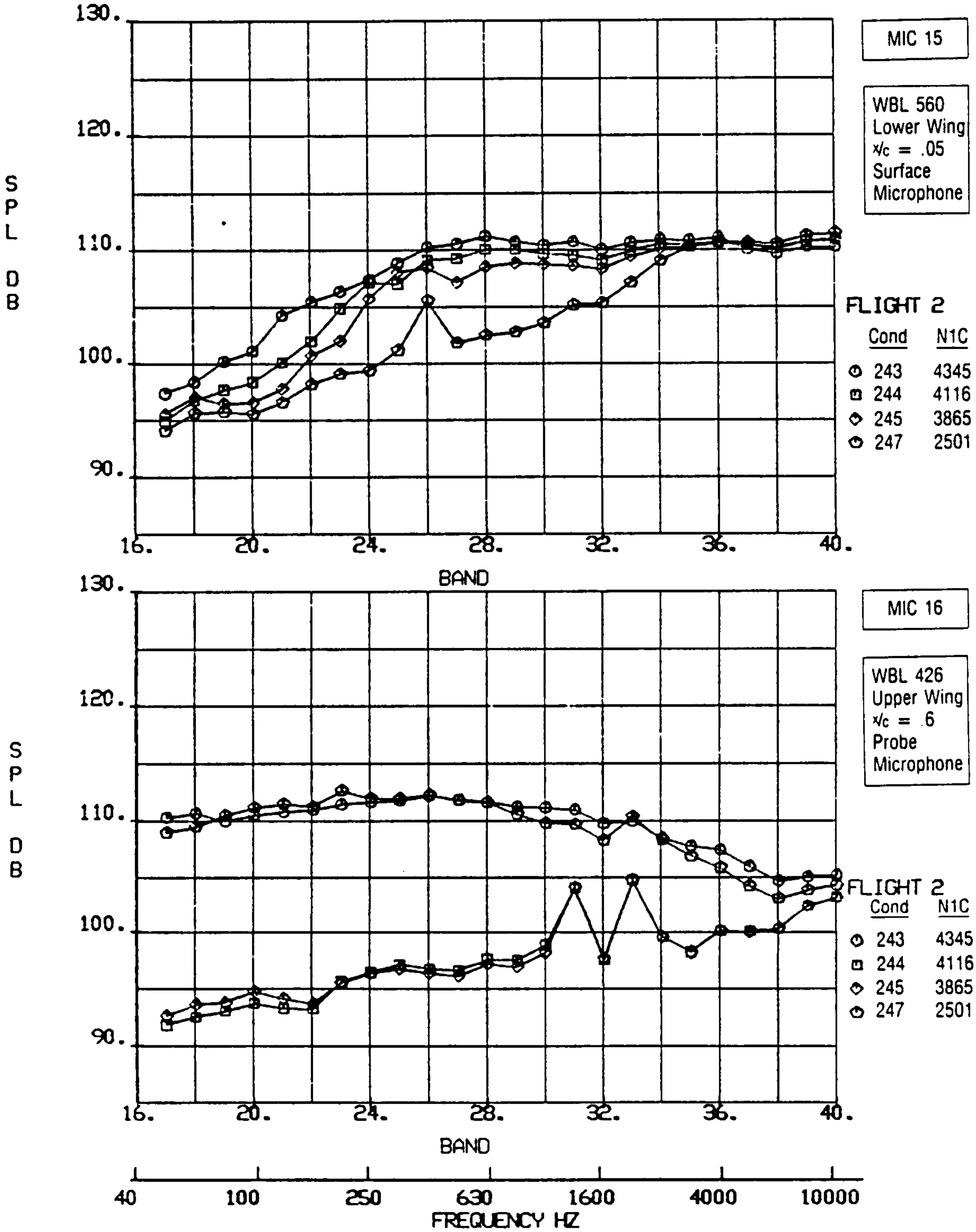


Figure 5-126. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

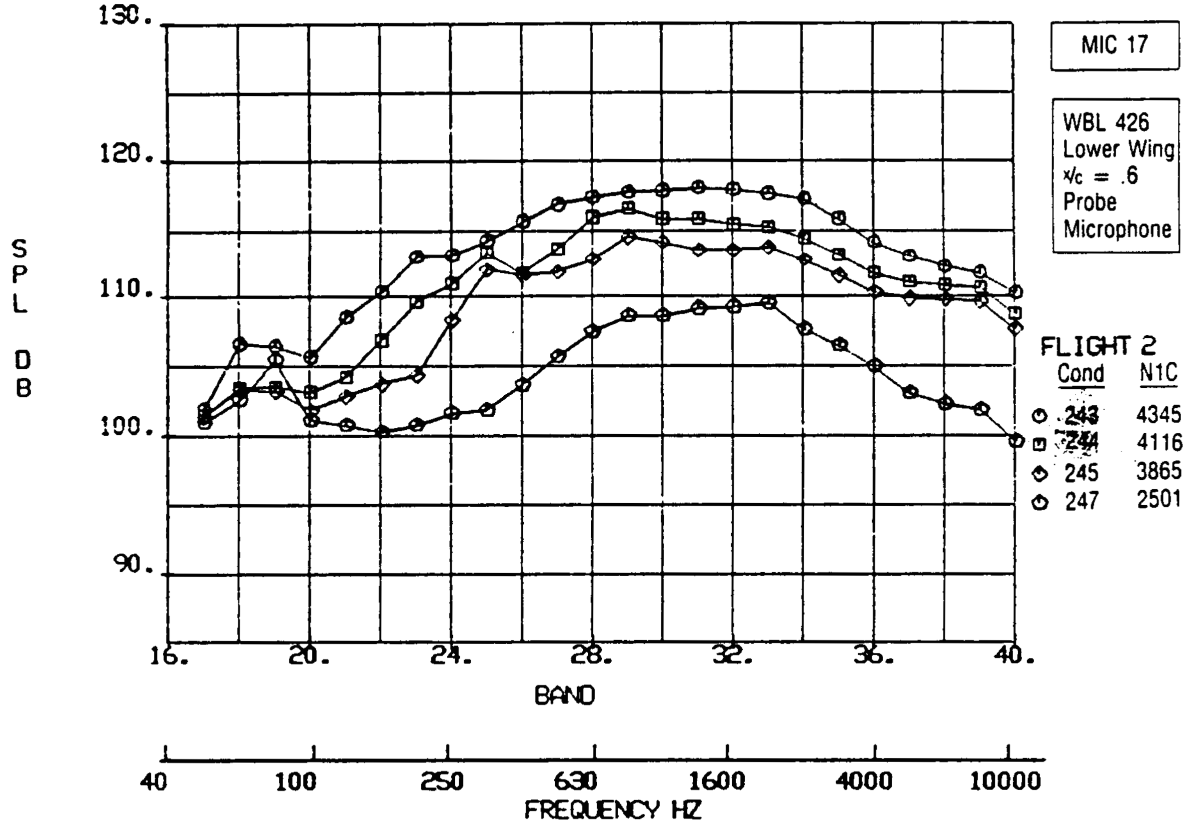


Figure 5-127. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 8, Engine Power Variation, M_{AP} = 0.82

Table 5-20. Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

Figures 5-128 through 5-136 present the one-third-octave band acoustic data for each microphone in Category 9 from Flight 2. Pertinent data corresponding to the Category 9, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
224	.80	40.5	4102	1.24	0
225	.80	40.5	3793	1.18	0
226	.79	40.5	3965	1.20	4.8
227	.80	40.5	3993	1.21	-4.8

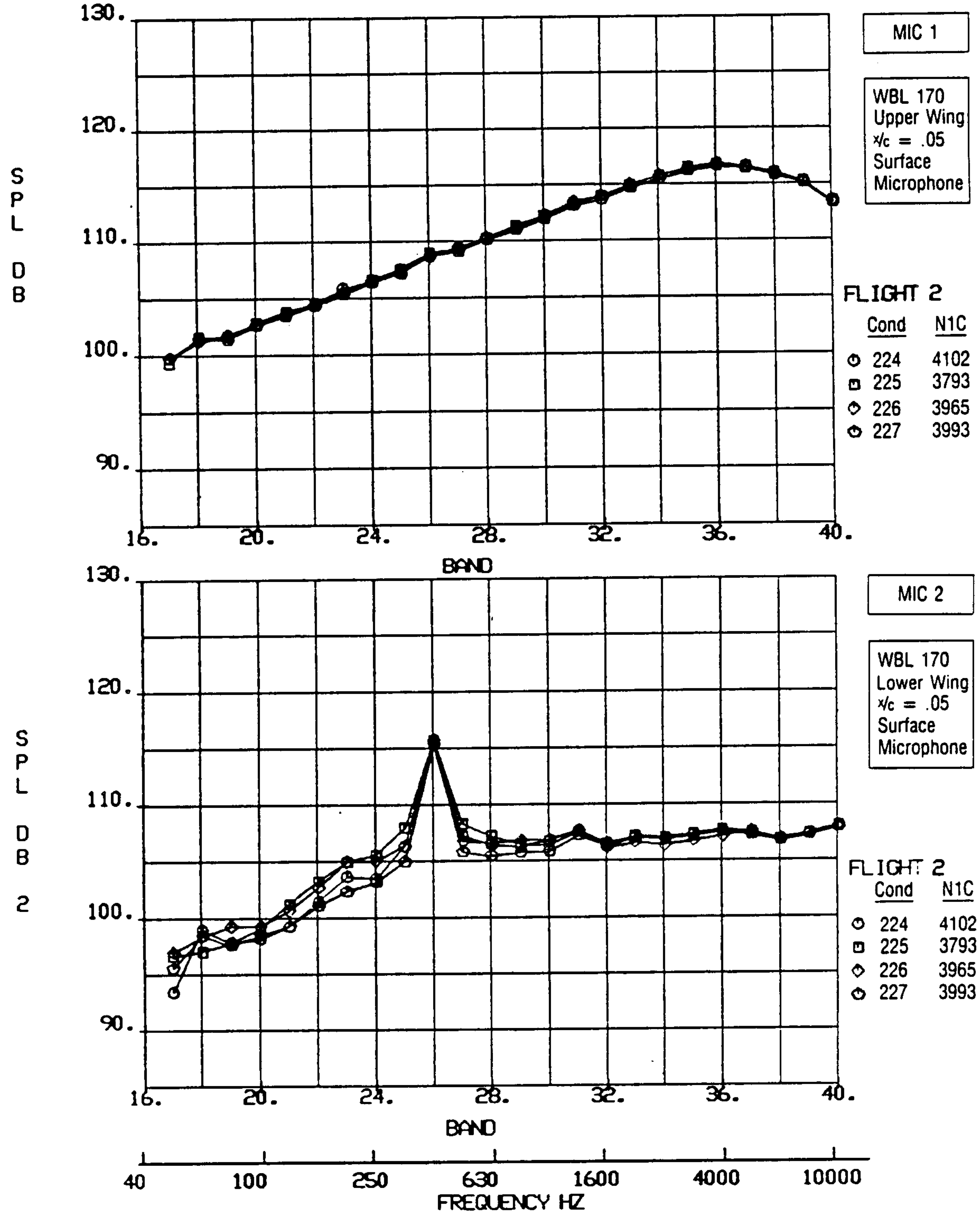


Figure 5-128. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

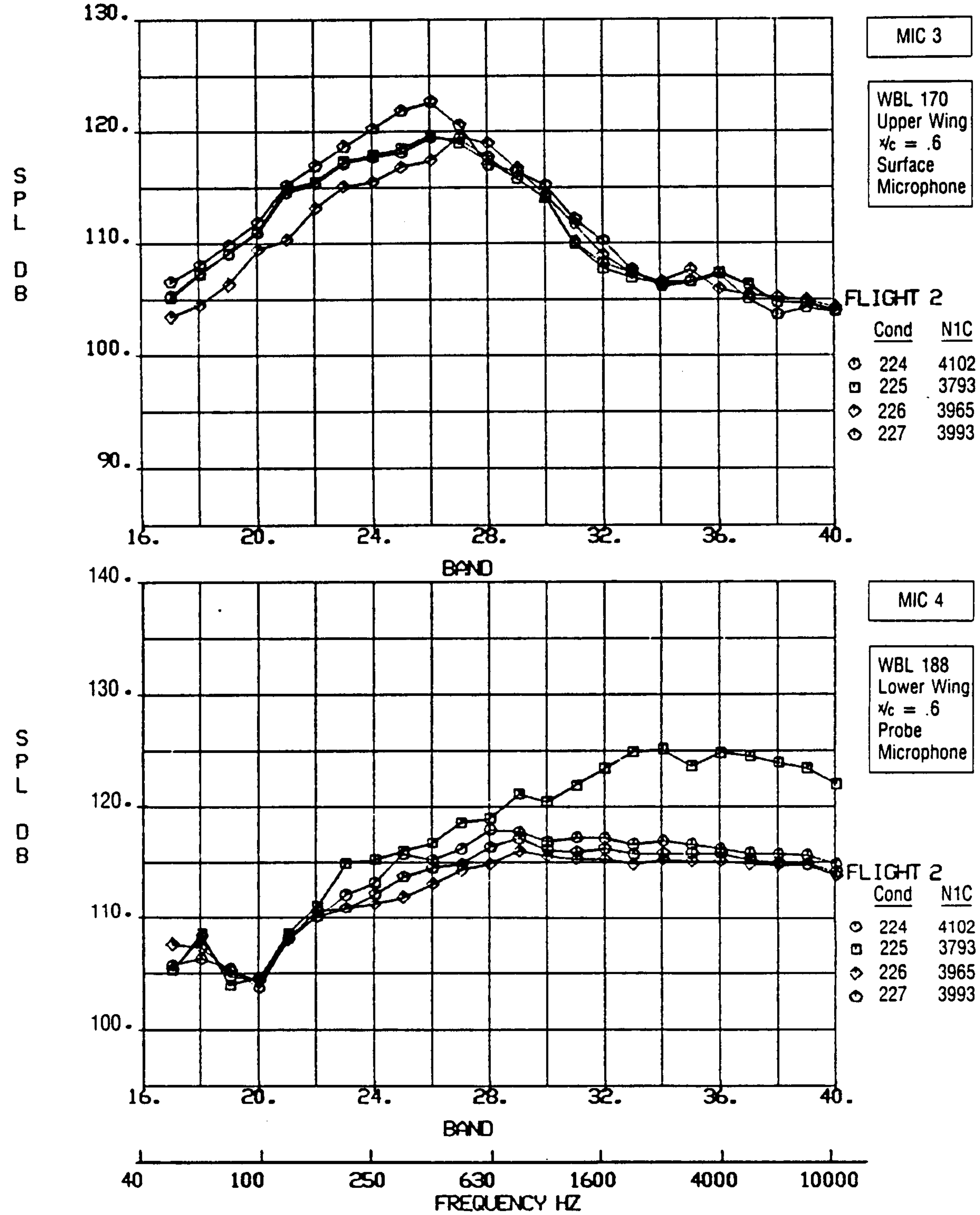


Figure 5-129. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

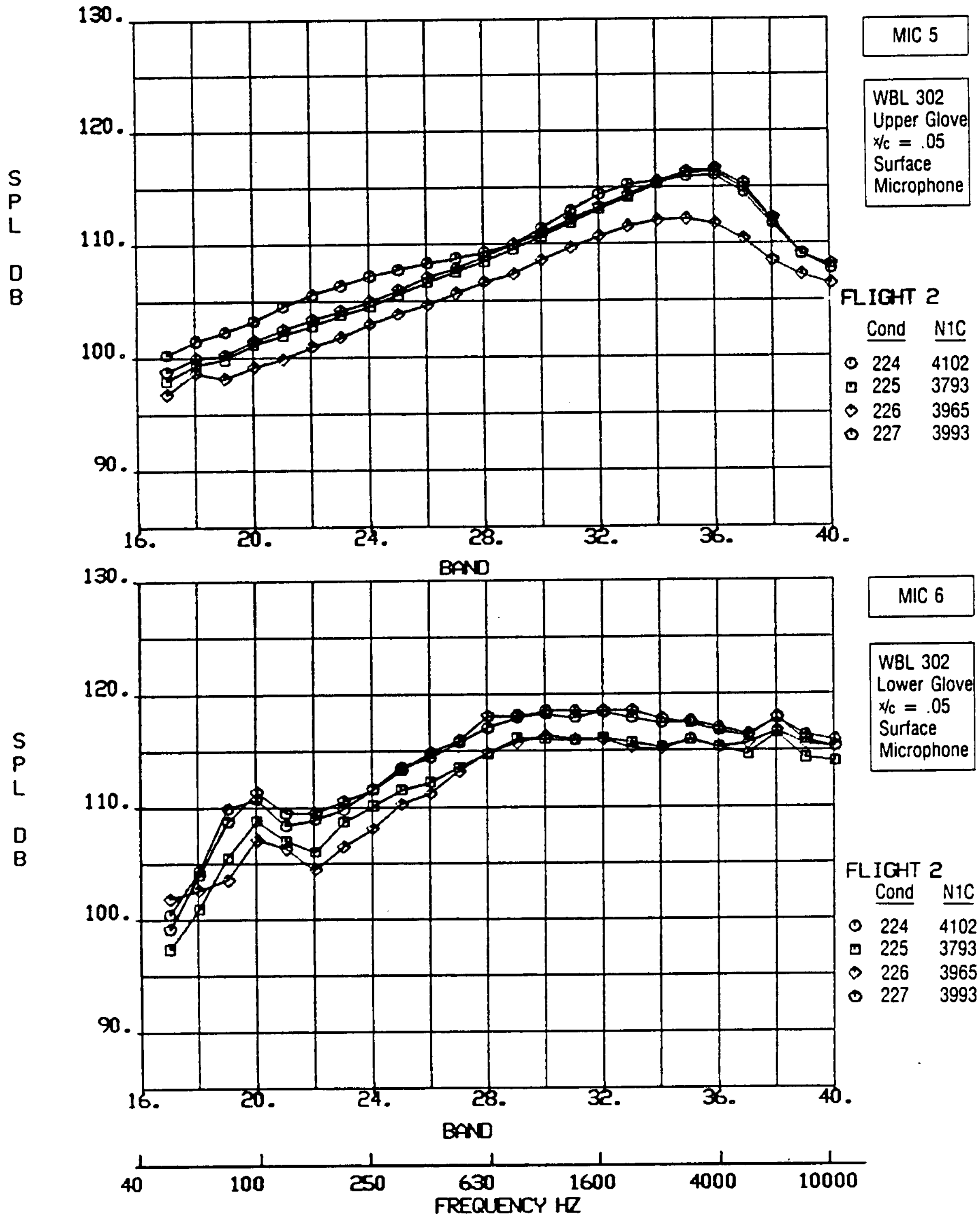


Figure 5-130. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

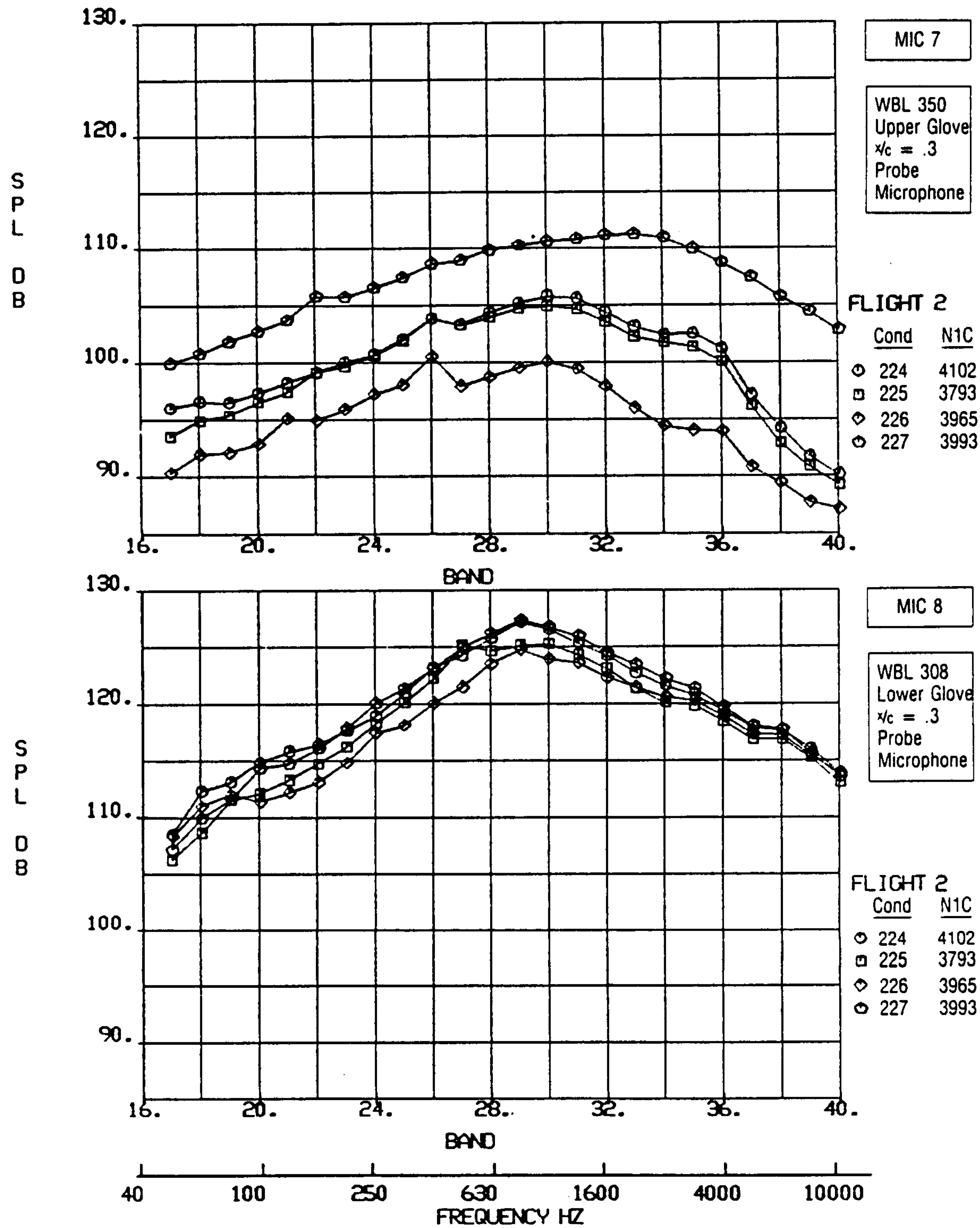


Figure 5-131. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

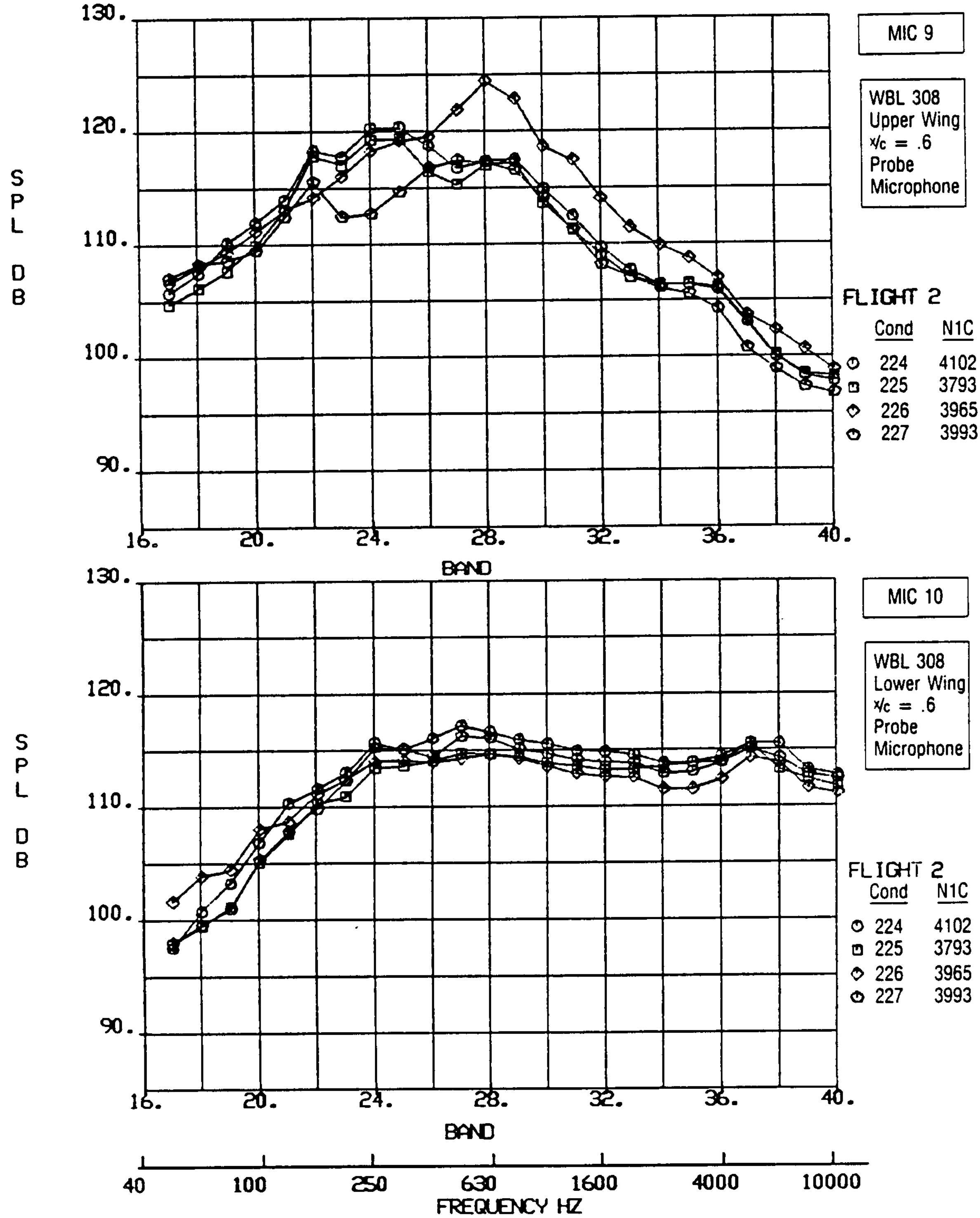


Figure 5-132. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

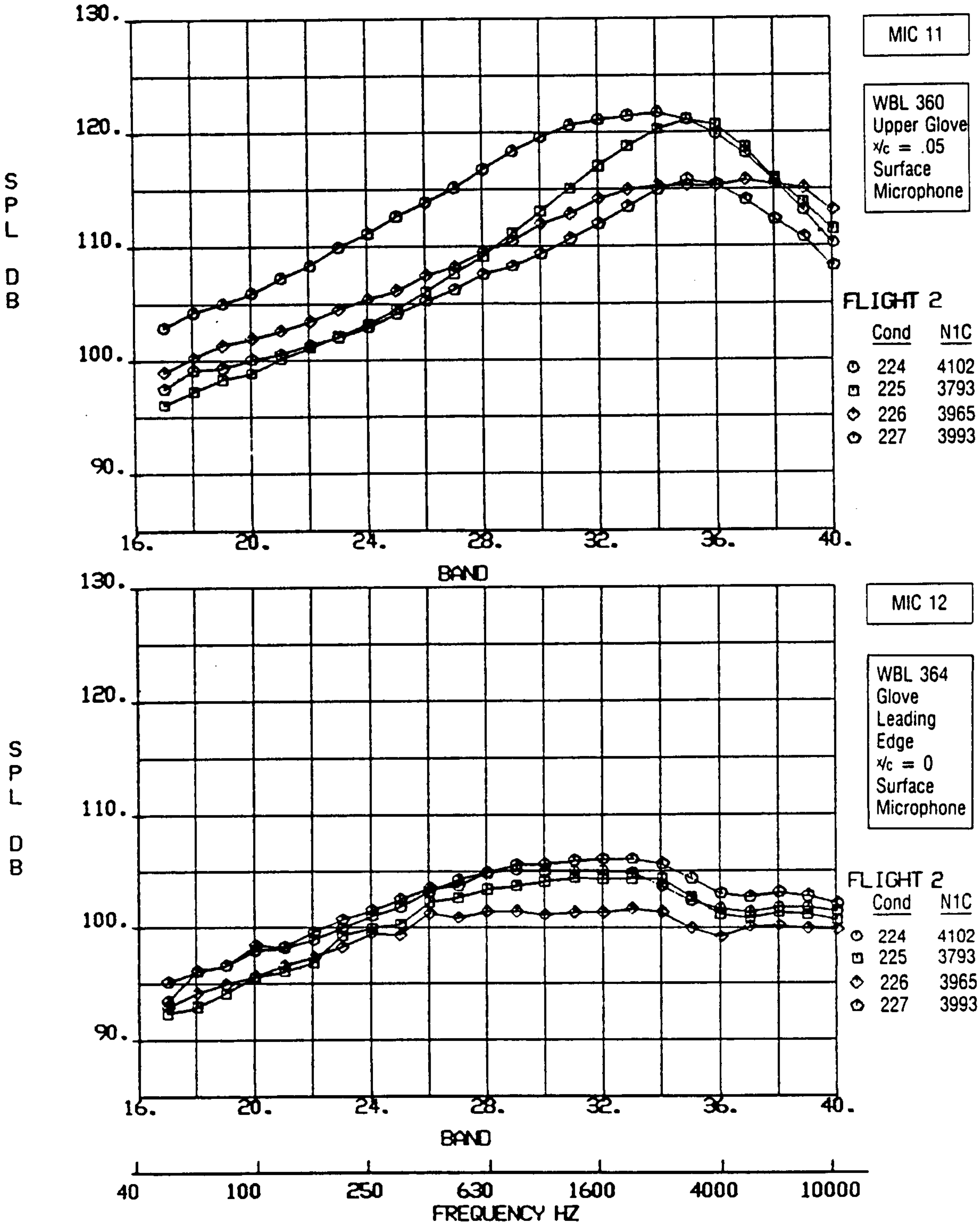


Figure 5-133. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

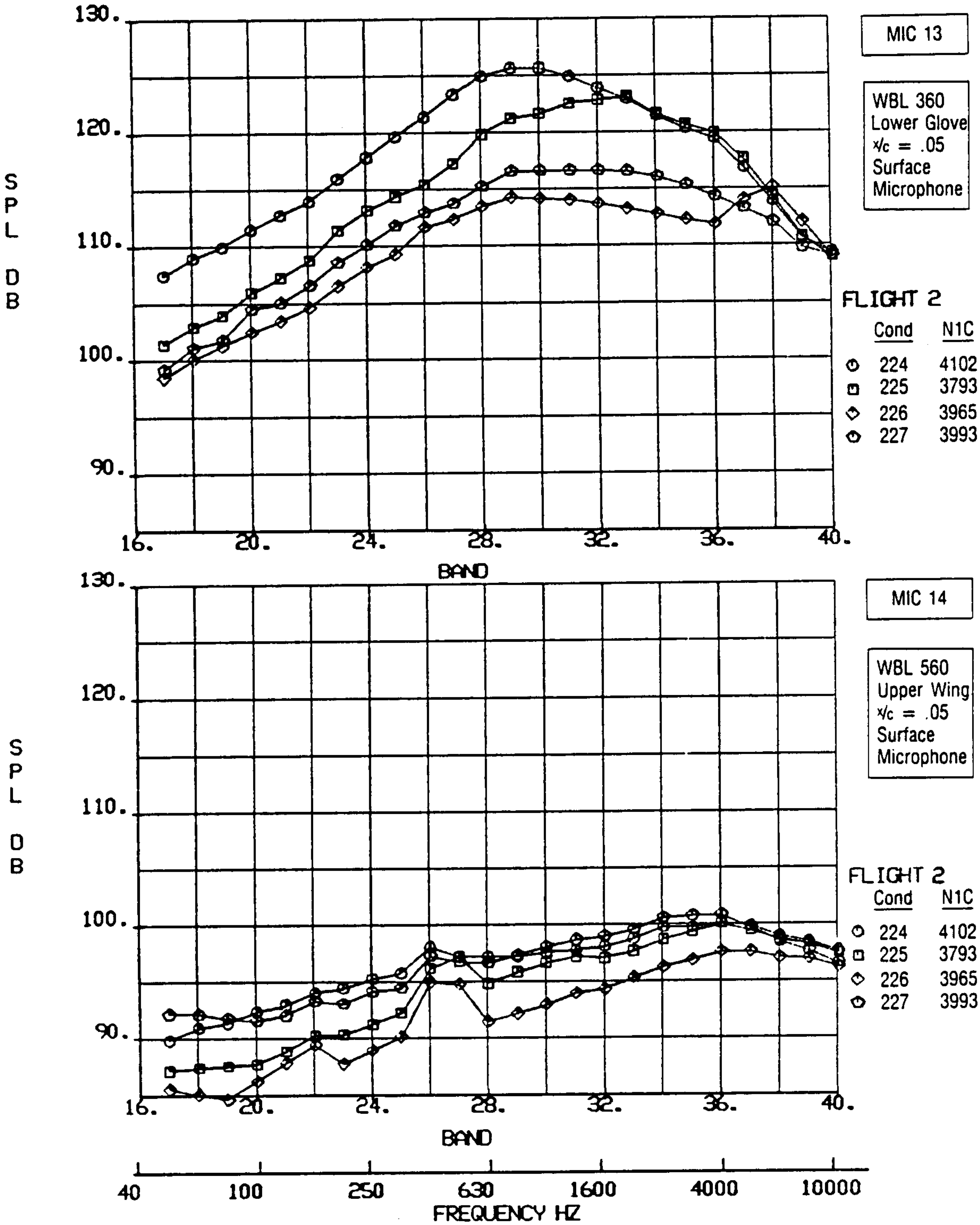


Figure 5-134. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

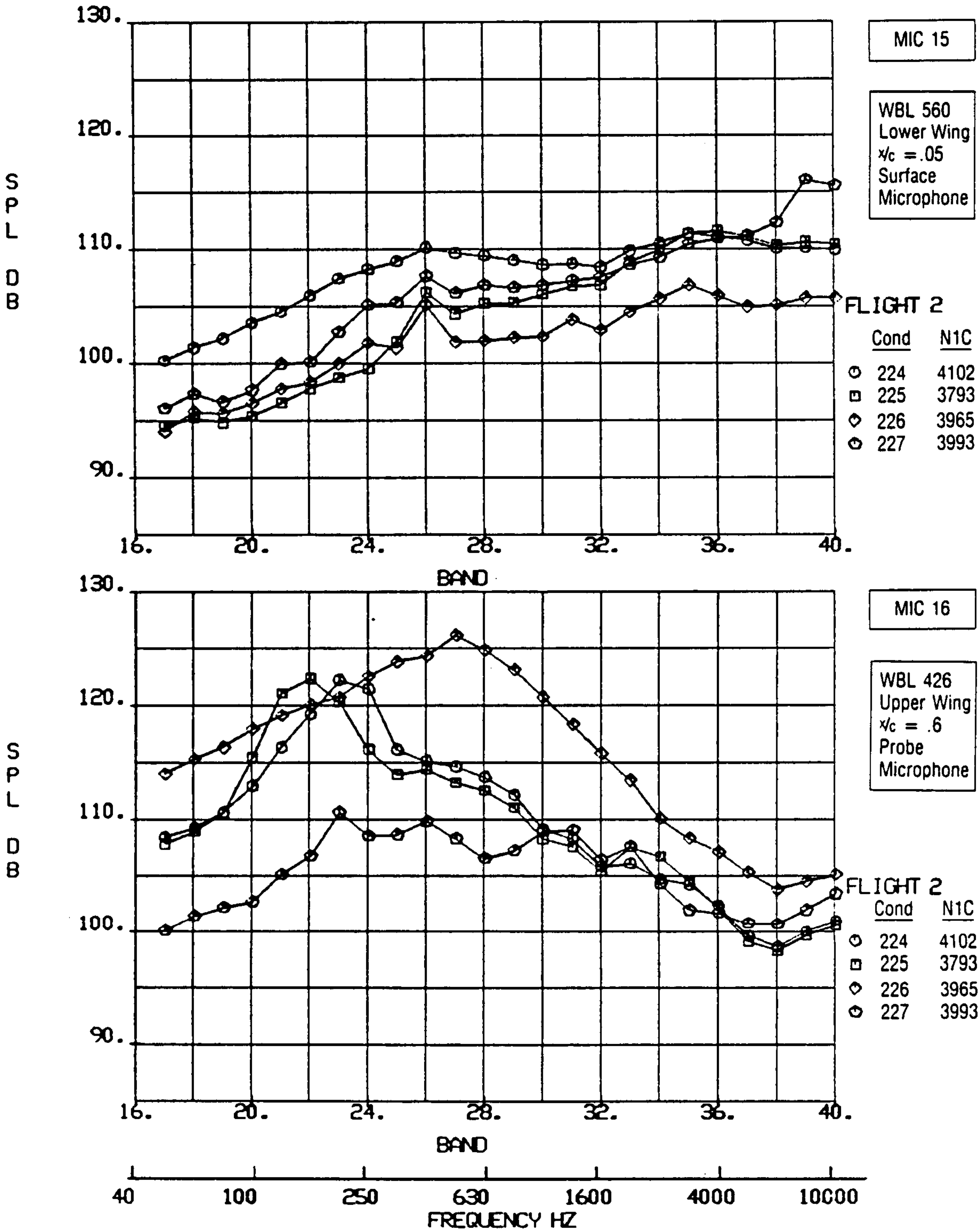


Figure 5-135. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

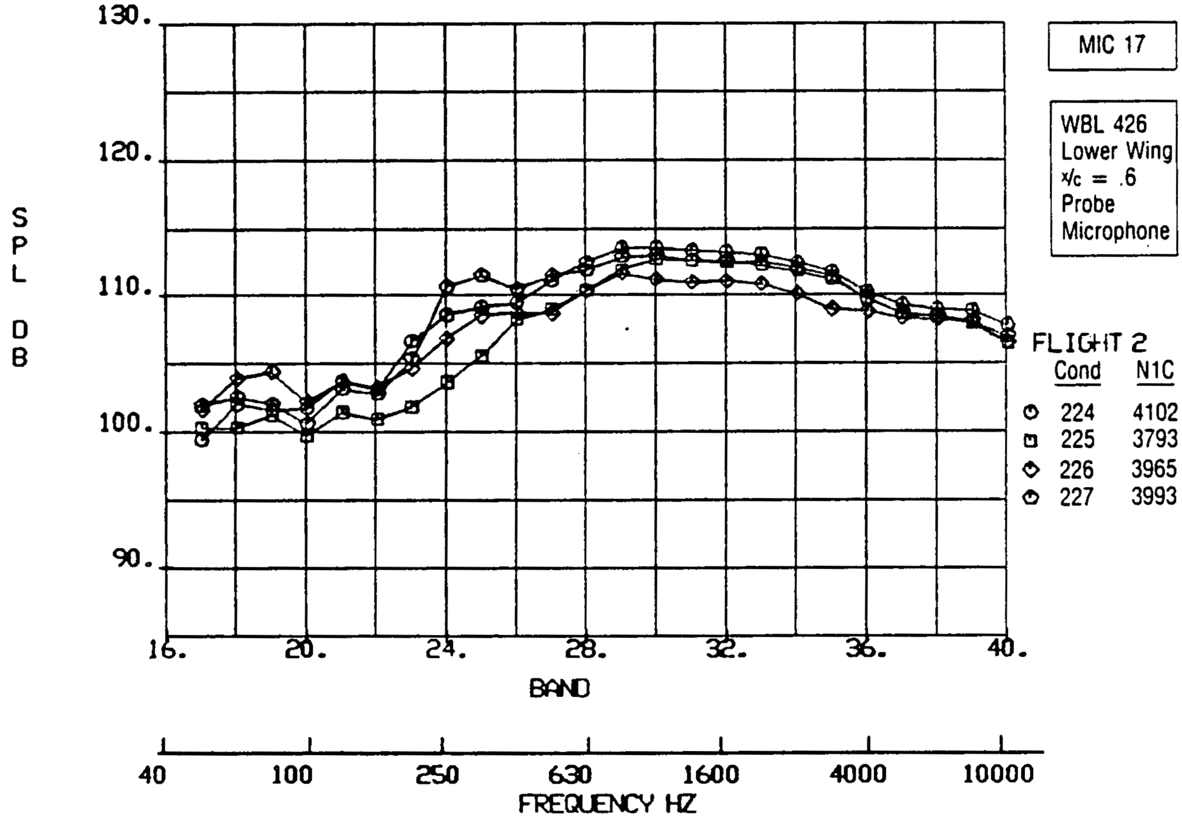


Figure 5-136. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 9, Sideslip Variation, M_{AP} = 0.80

Table 5-21. Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

Figures 5-137 through 5-145 present the one-third-octave band acoustic data for each microphone in Category 10 from Flight 2. Pertinent data corresponding to the Category 10, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
232	.70	39	4019	1.15	0
233	.70	39	3631	1.06	0
234	.70	39	3786	1.09	6.8
235	.71	39	3816	1.11	-6.7

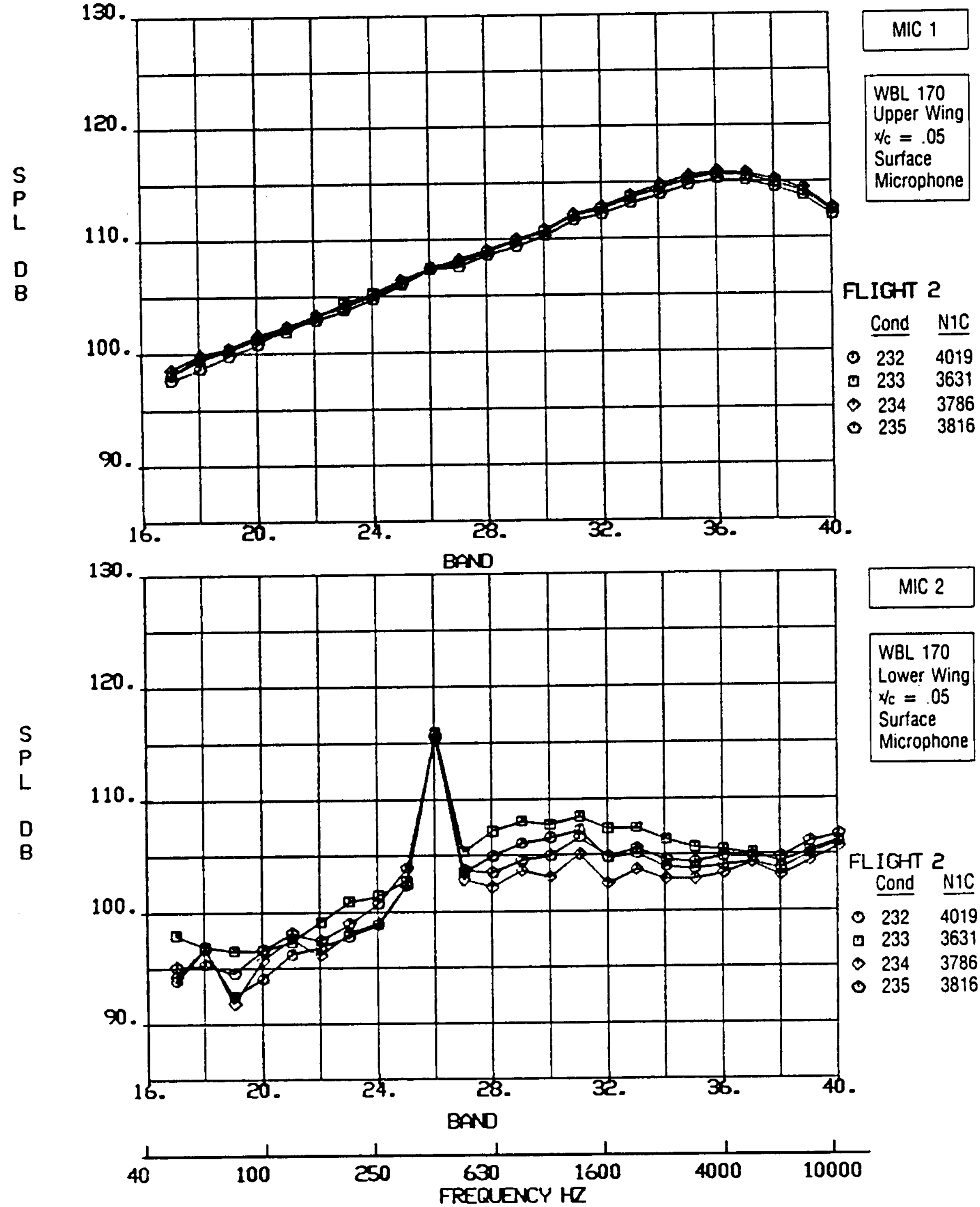


Figure 5-137. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

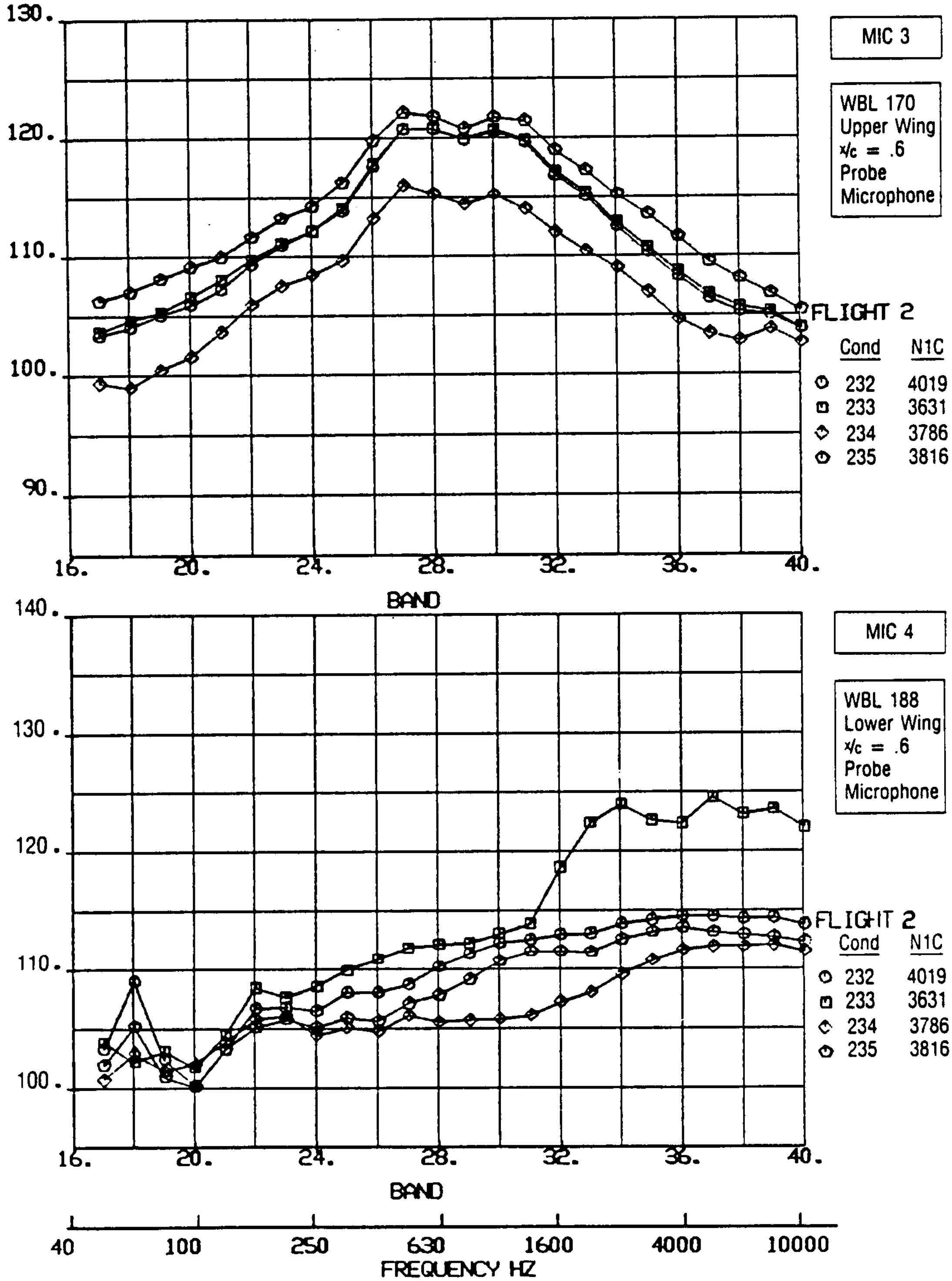


Figure 5-138. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

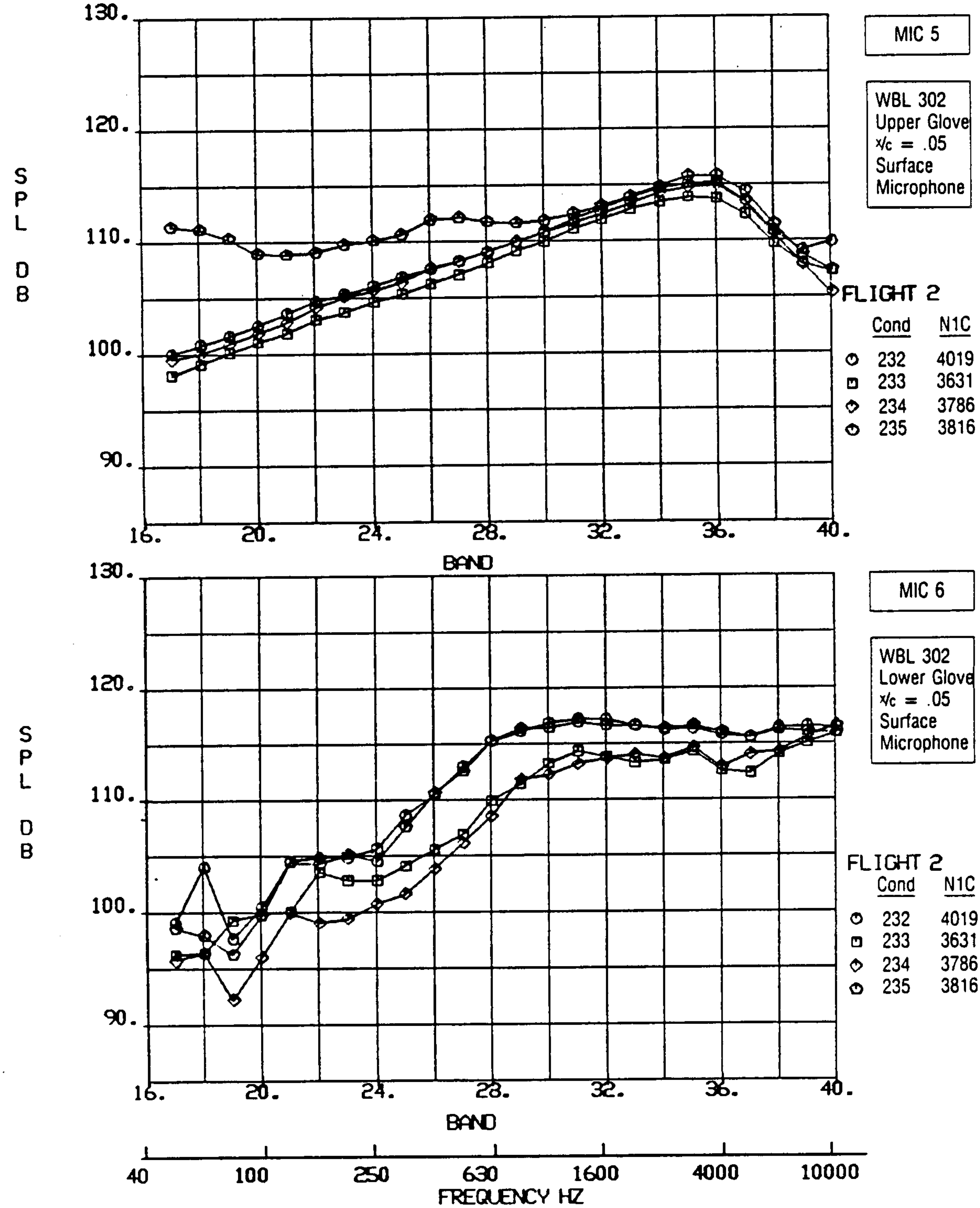


Figure 5-139. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

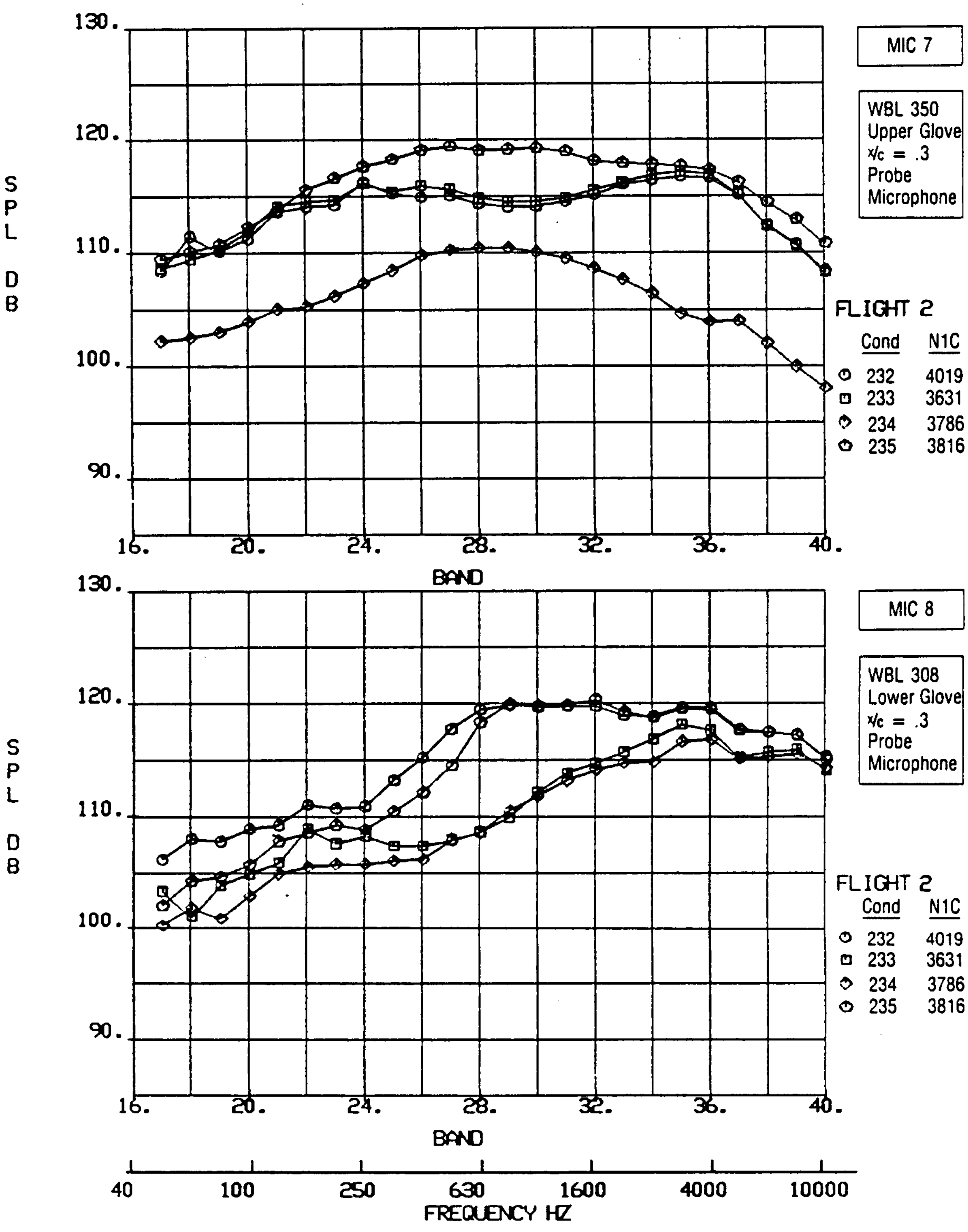


Figure 5-140. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

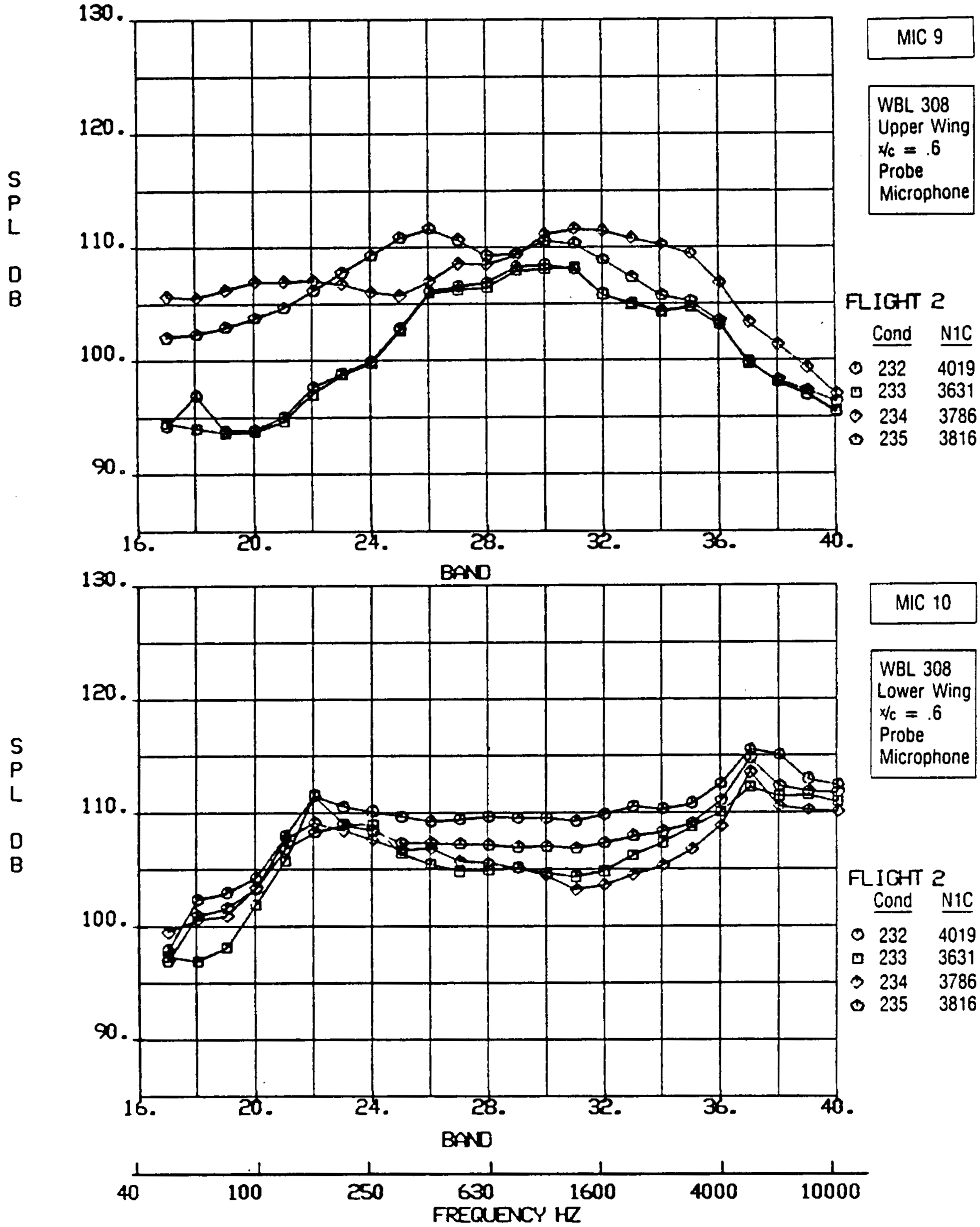


Figure 5-141. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

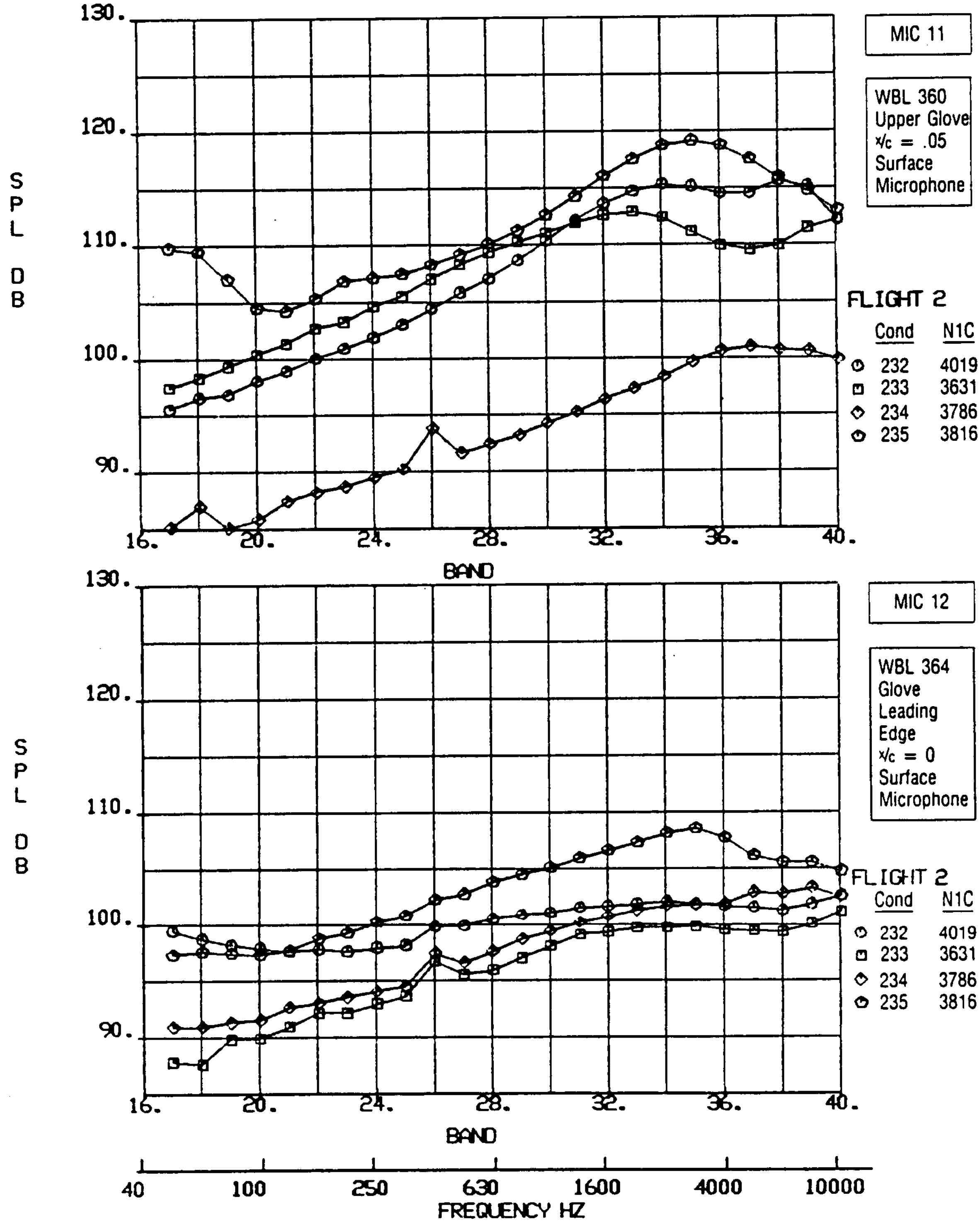


Figure 5-142. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

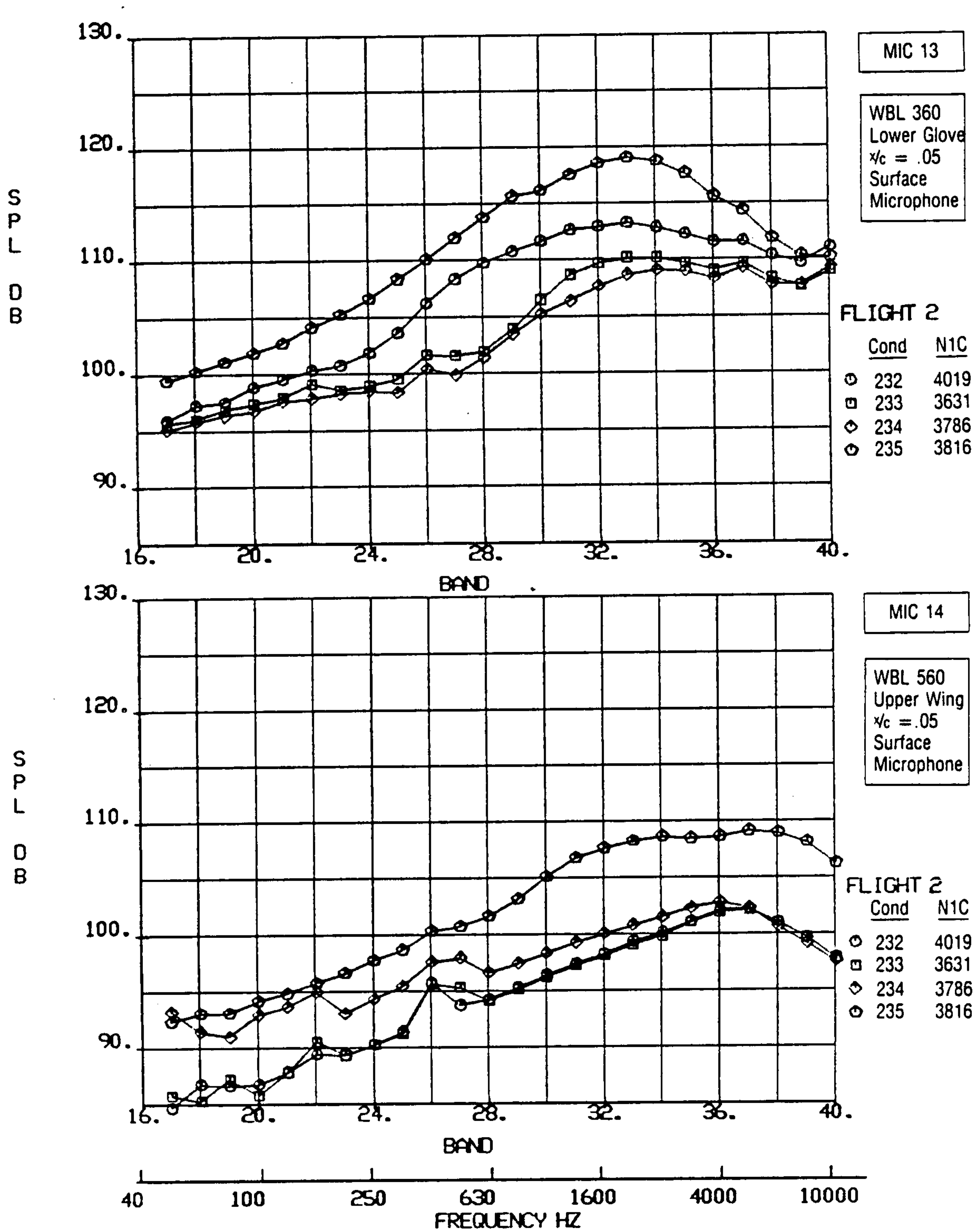


Figure 5-143. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

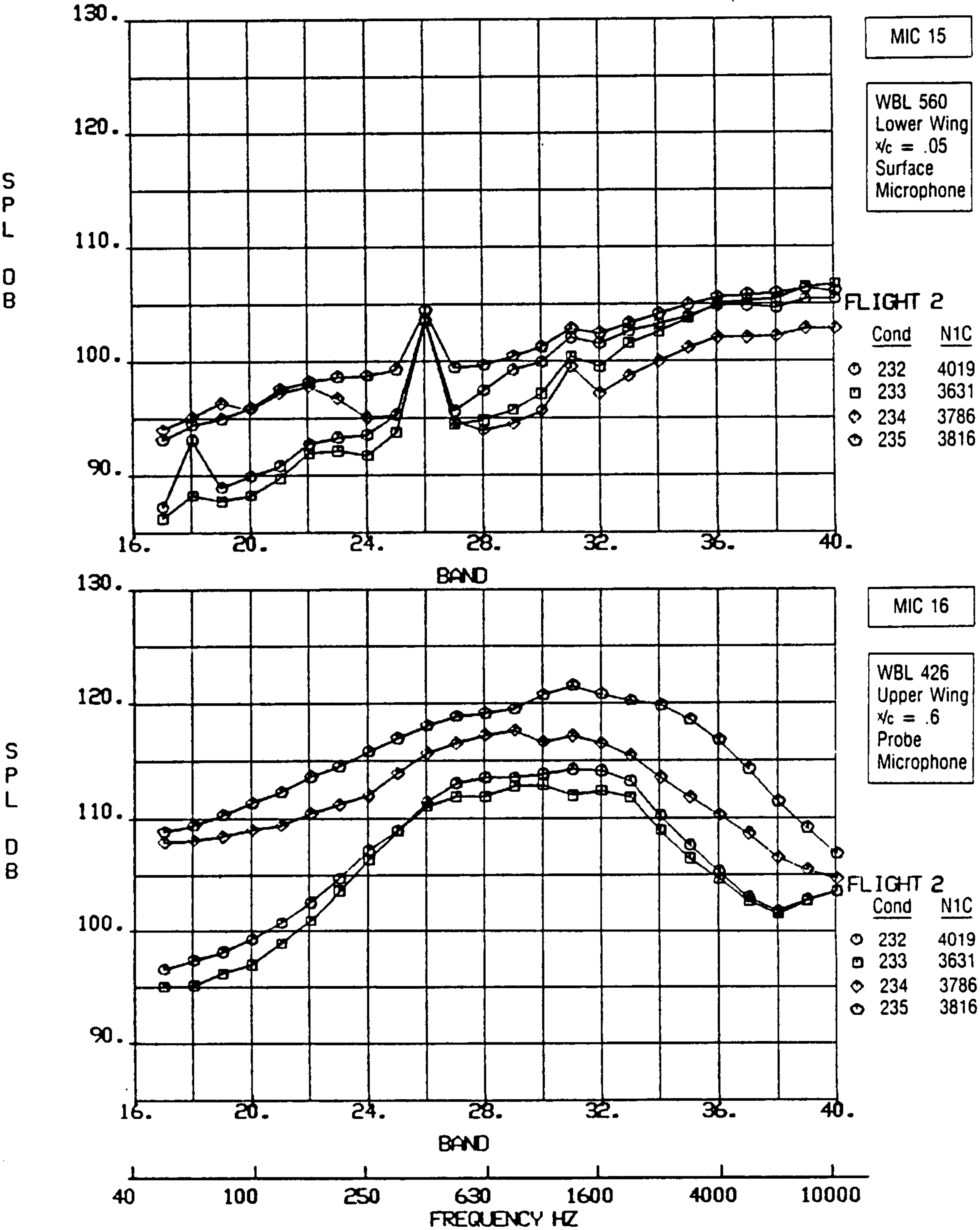


Figure 5-144. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

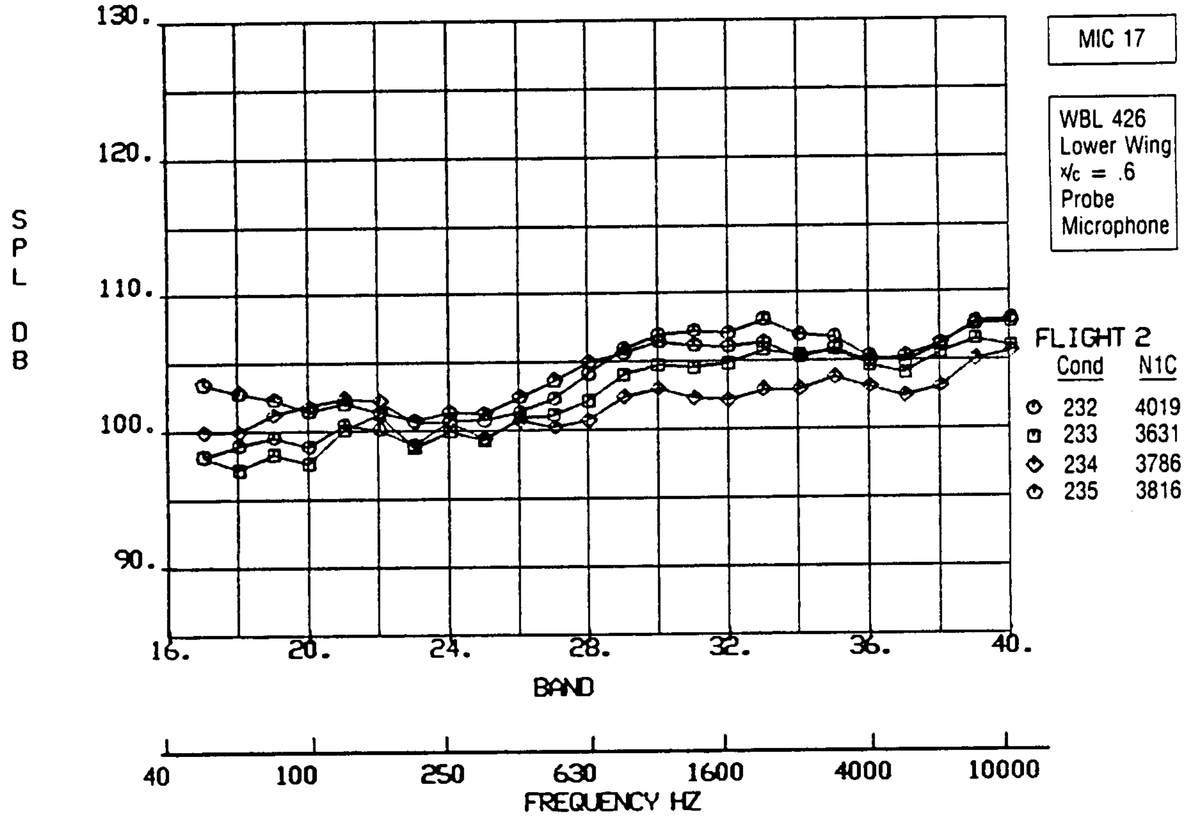


Figure 5-145. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 10, Sideslip Variation, M_{AP} = 0.70

Table 5-22. Flight 2, Category 11, Other Sideslip Data

Figures 5-146 through 5-154 present the one-third-octave band acoustic data for each microphone in Category 11 from Flight 2. Pertinent data corresponding to the Category 11, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
240	.80	38	3673	1.14	3.9
246	.82	39	4355	1.29	4.0

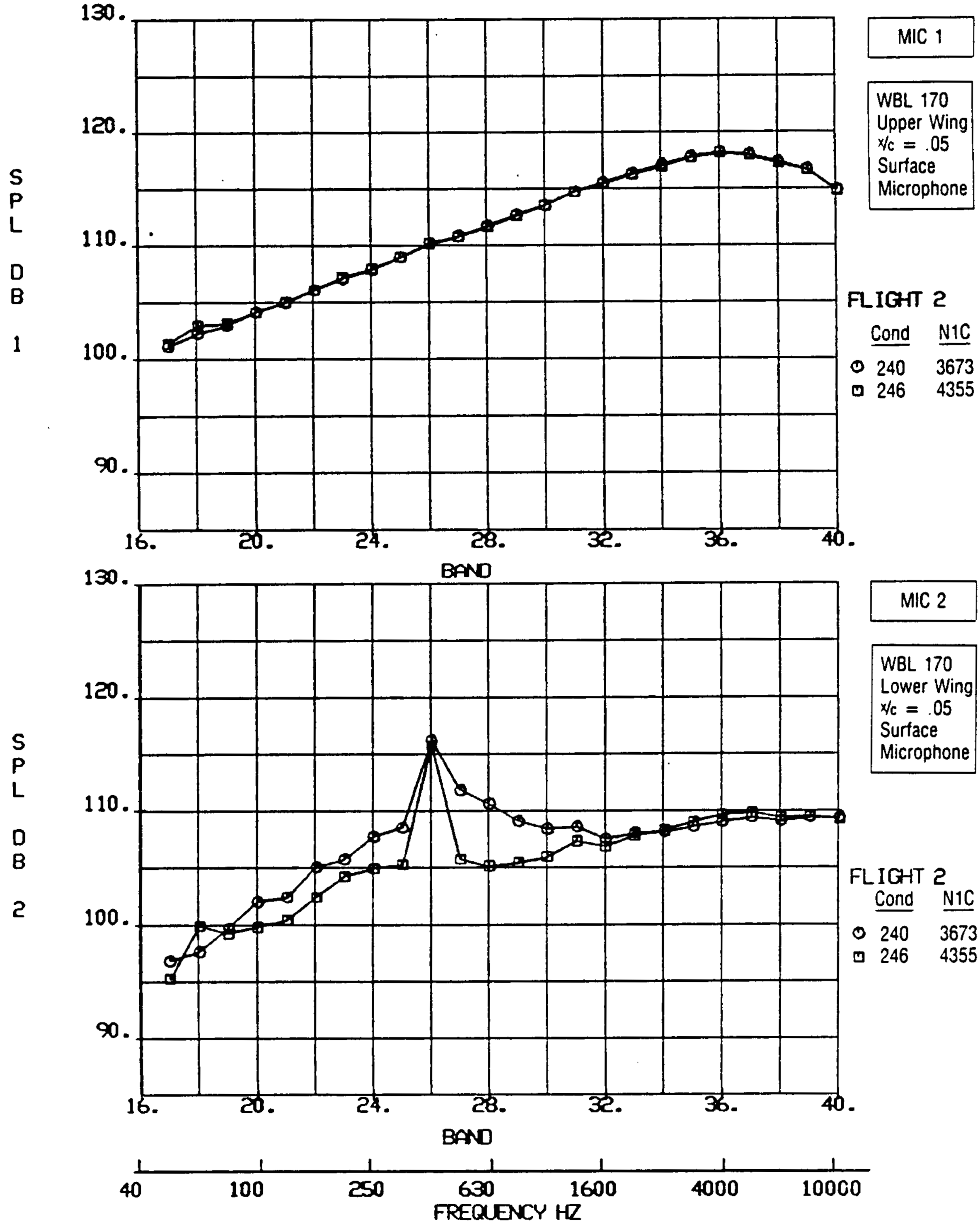


Figure 5-146. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

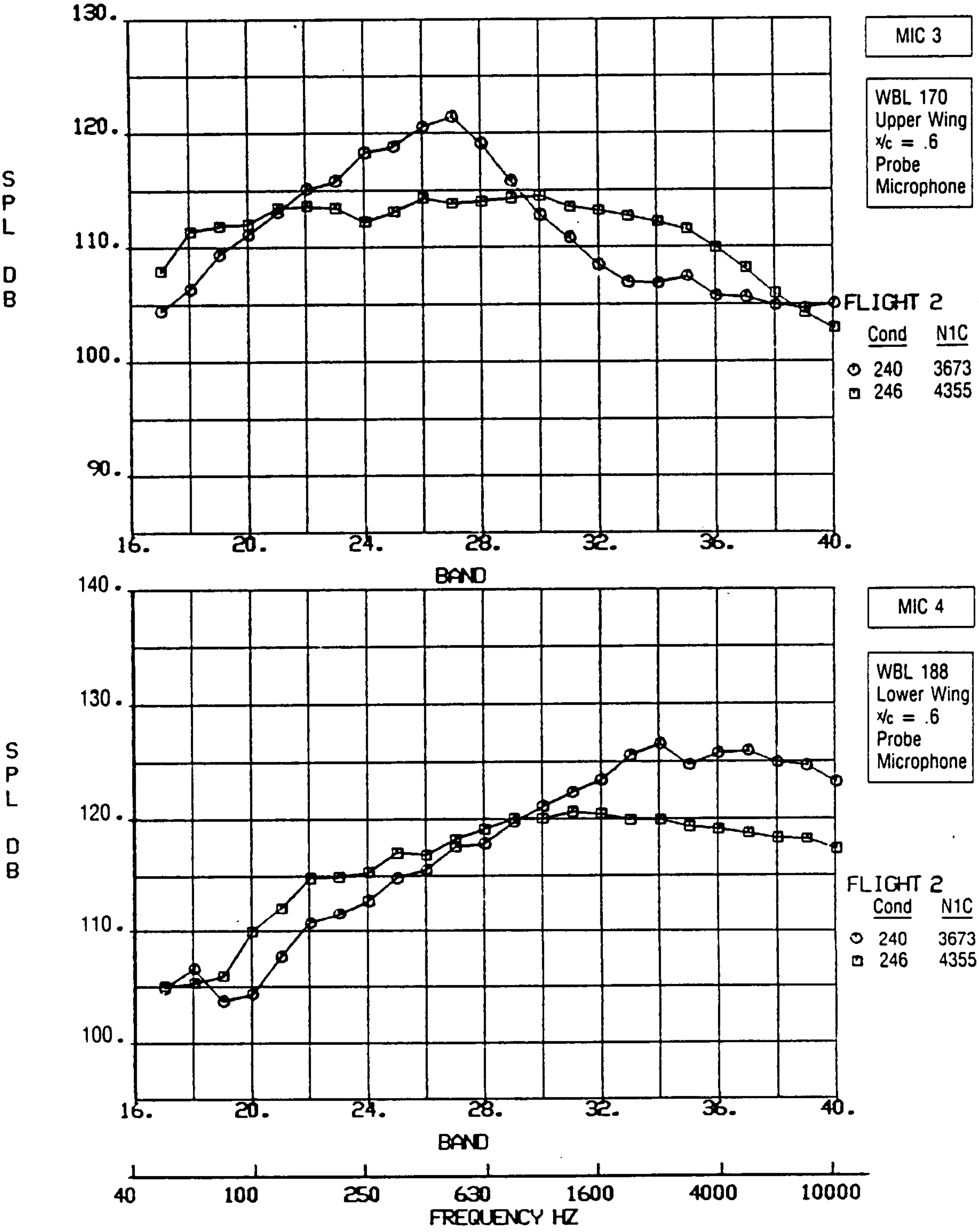


Figure 5-147. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

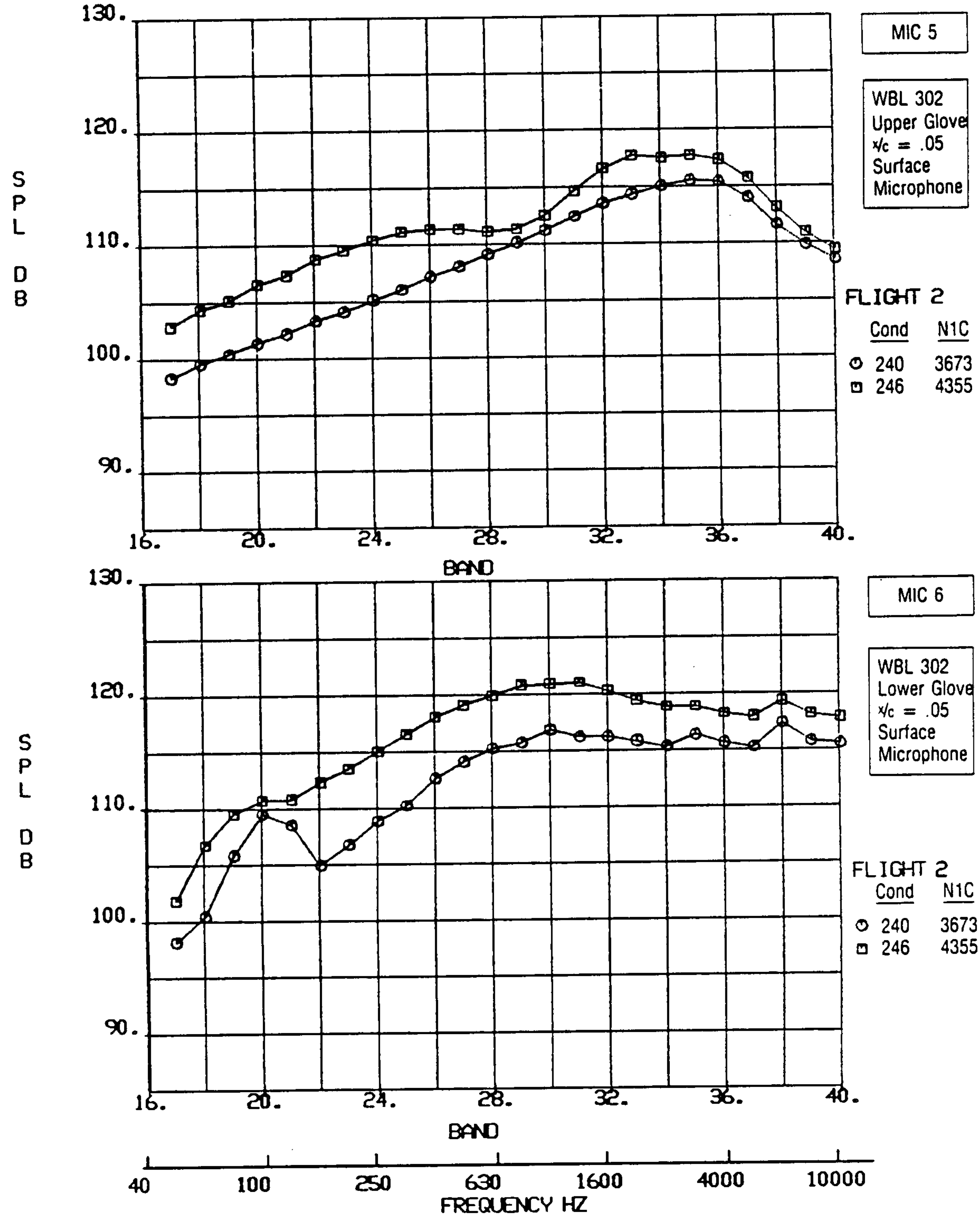


Figure 5-148. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

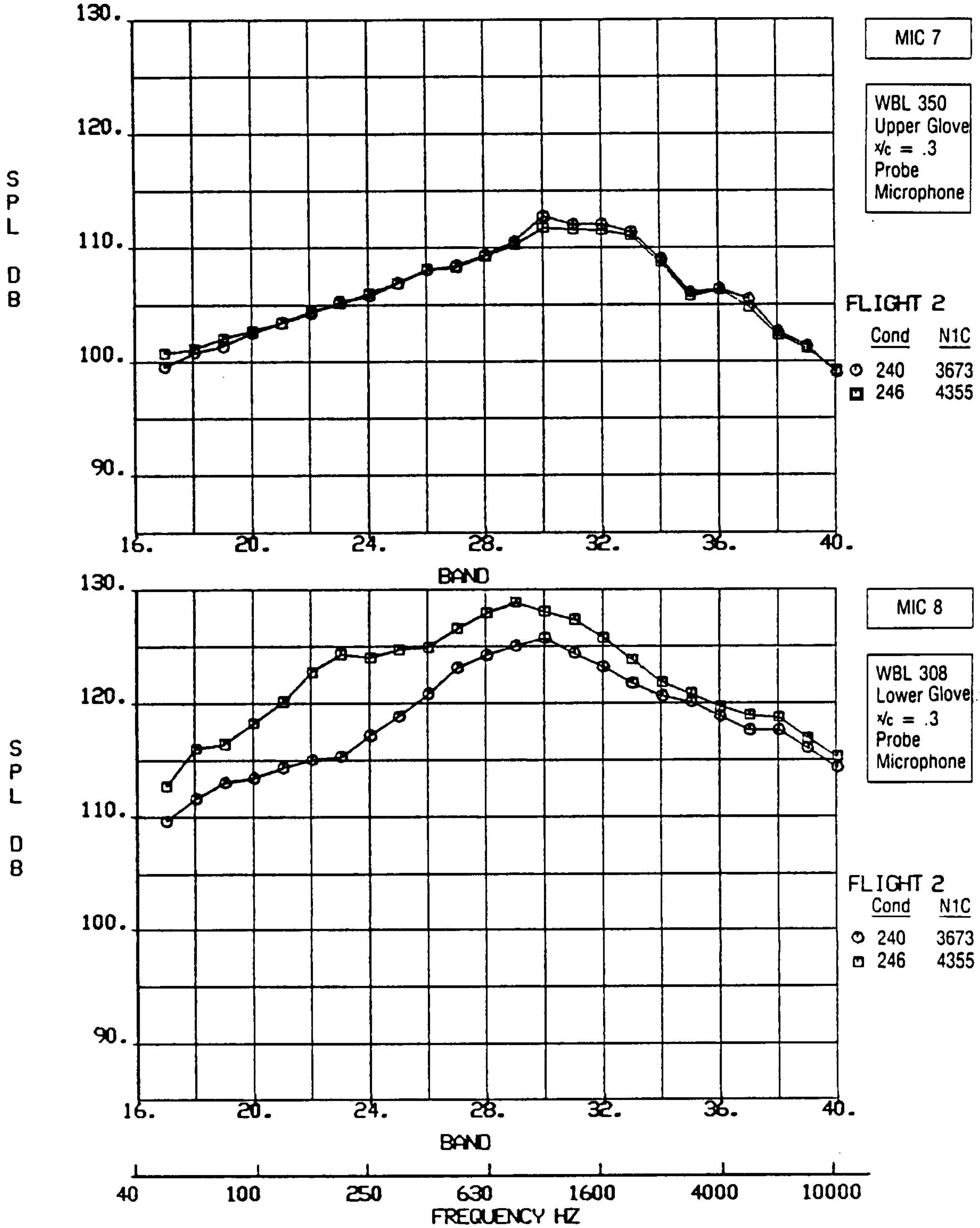


Figure 5-149. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

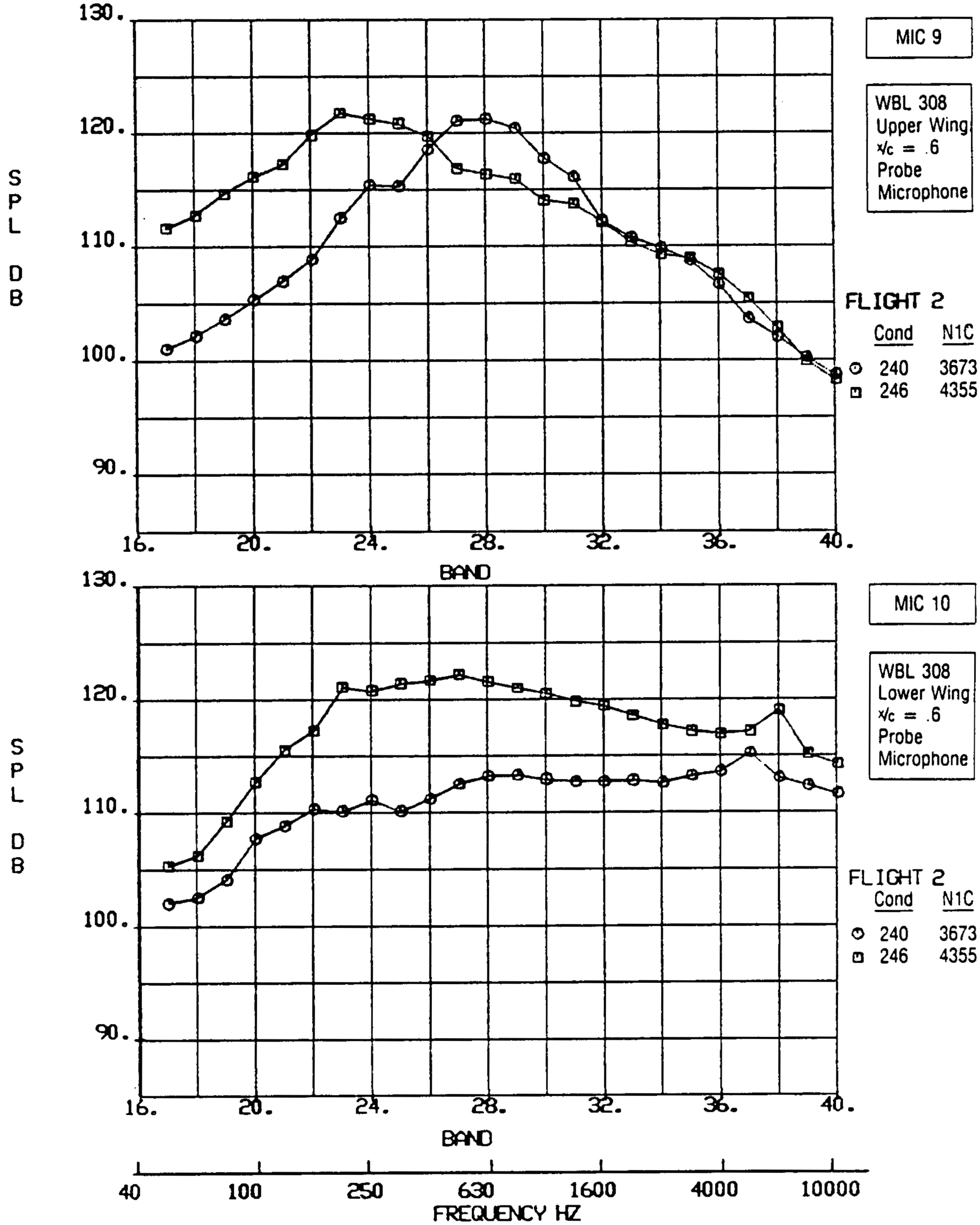


Figure 5-150. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

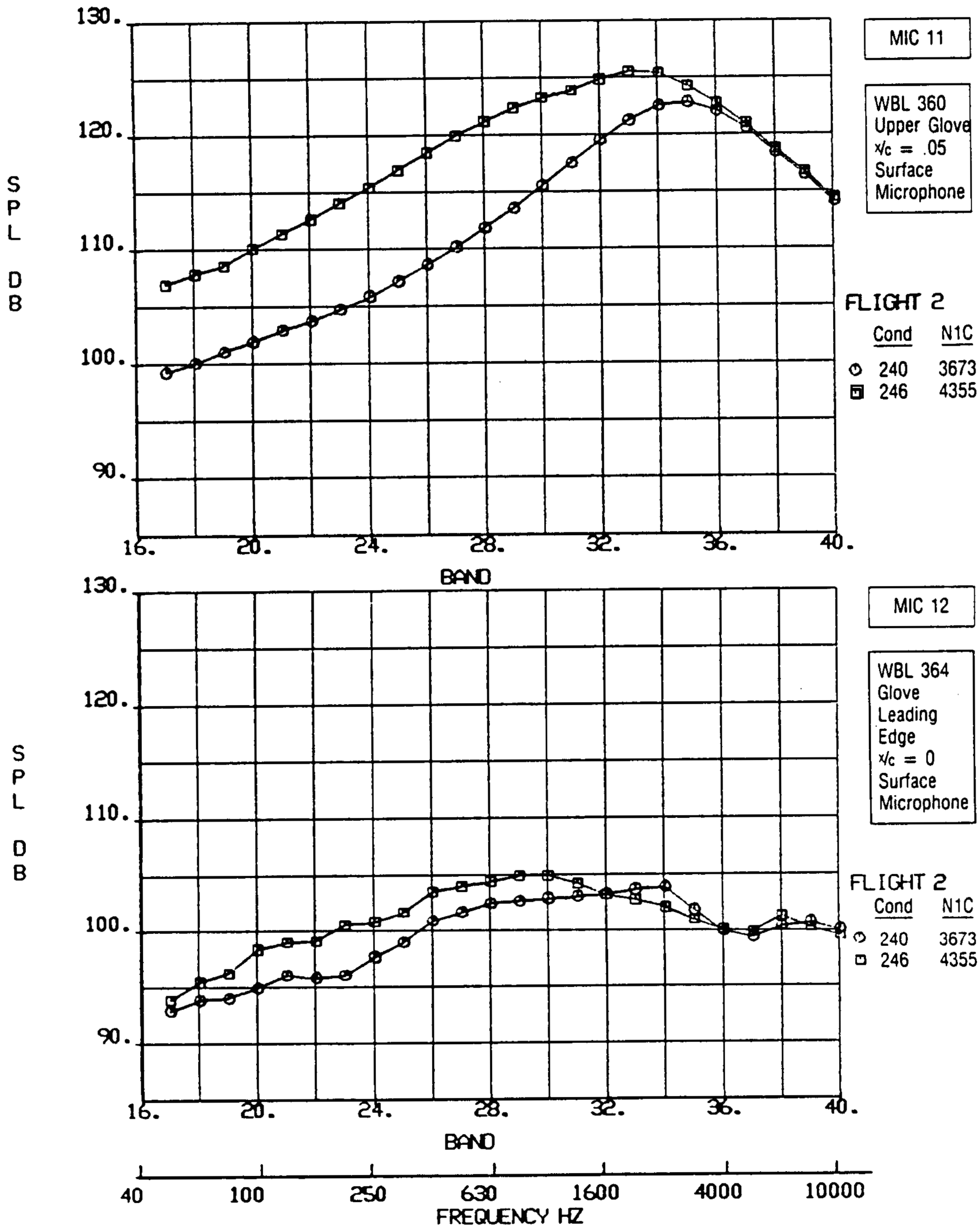


Figure 5-151. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

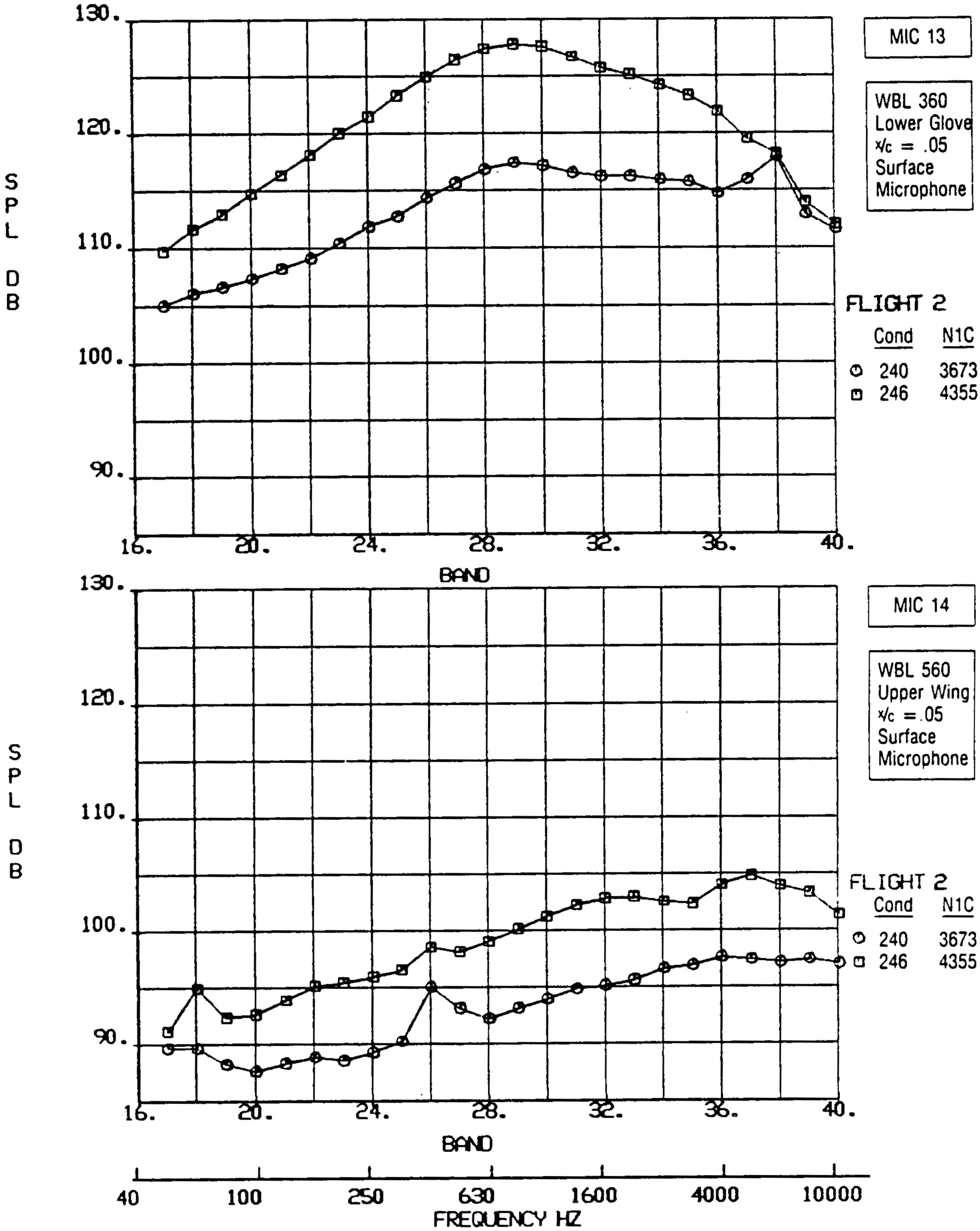


Figure 5-152. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

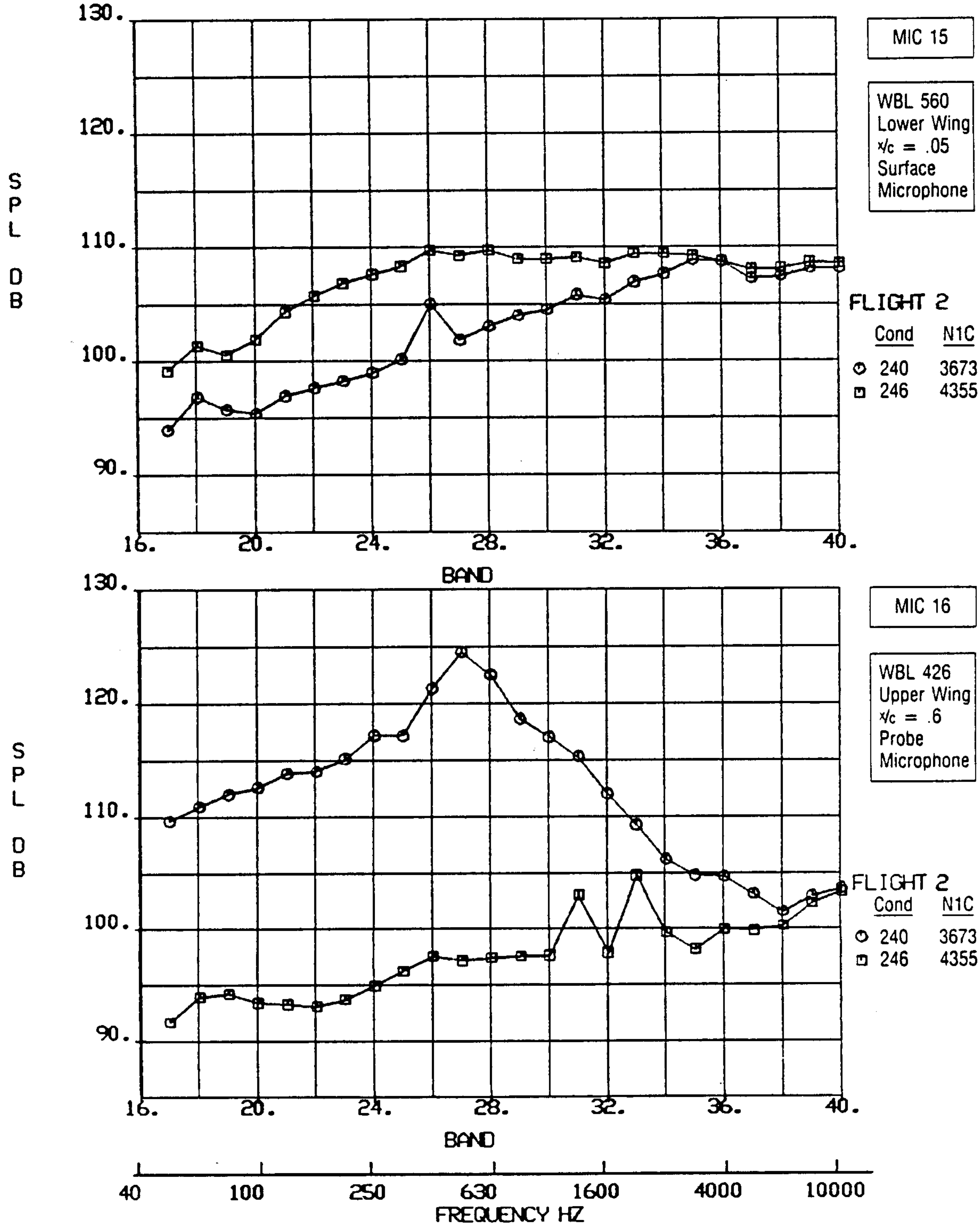


Figure 5-153. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

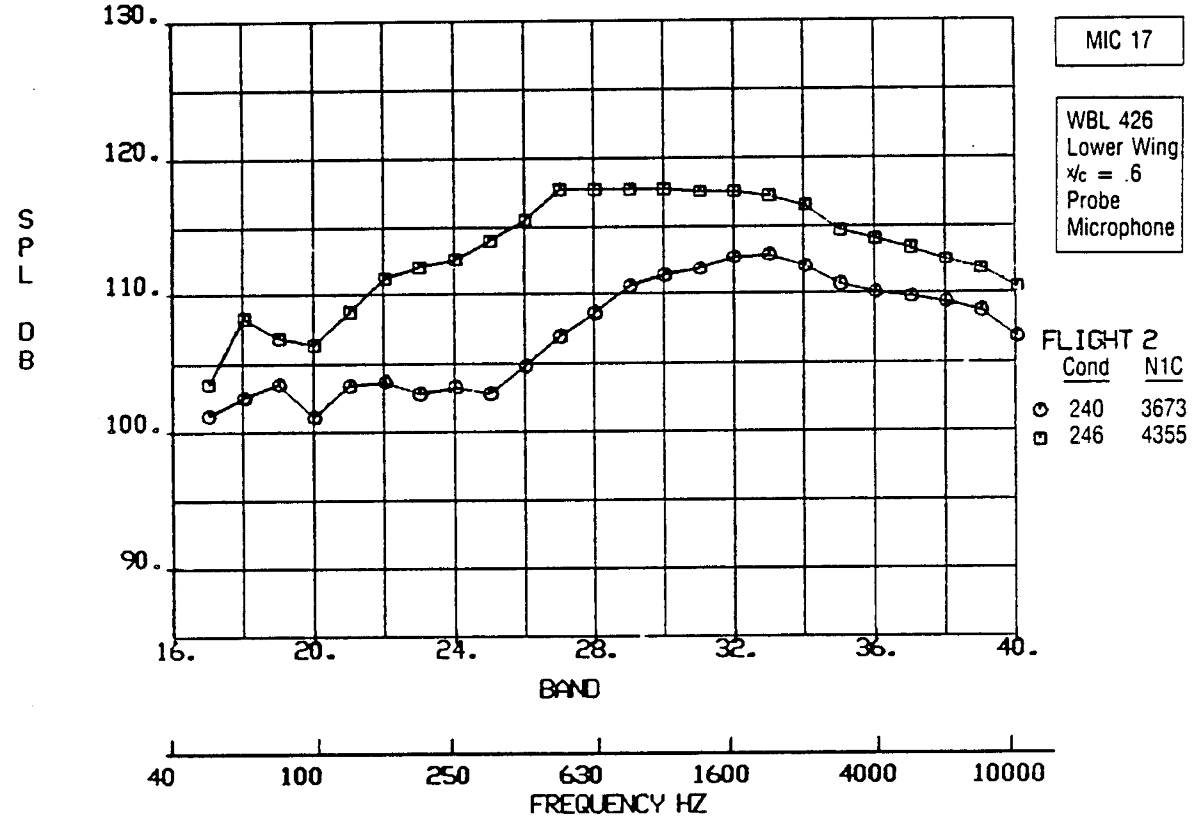


Figure 5-154. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 11, Other Sideslip Data

Table 5-23. Flight 2, Category 12, Other Zero Sideslip Data

Figures 5-155 through 5-172 present the one-third-octave band acoustic data for each microphone in Category 12 from Flight 2. Pertinent data corresponding to the Category 12, Flight 2 conditions are tabulated as follows:

Cond. no.	Airplane Mach no.	Altitude, x 10^3 ft	Right engine N_{1C}	Fan exhaust Mach no.	Sideslip, deg
242	.83	43	4321	1.30	0
249	.78	39	3717	1.14	0
250	.75	39	3723	1.12	0
251	.76	39	4426	1.26	0
252	.75	39	4007	1.19	0
229	.75	40.5	3330	1.04	0
215	.82	39	4346	1.24	0
216	.83	39	4331	1.30	0
248	.82	39	4023	1.24	0
222	.81	39	3903	1.20	0

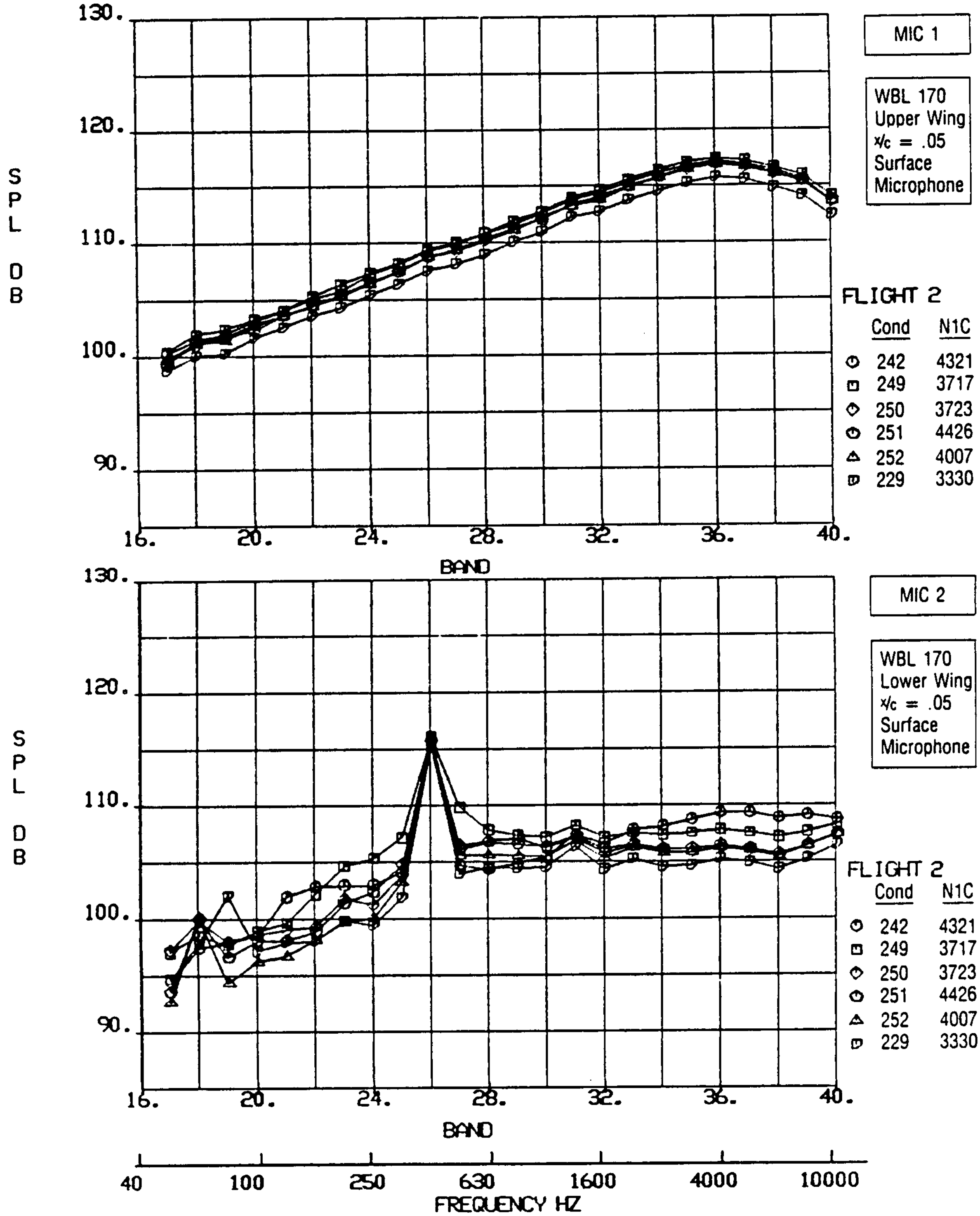


Figure 5-155. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

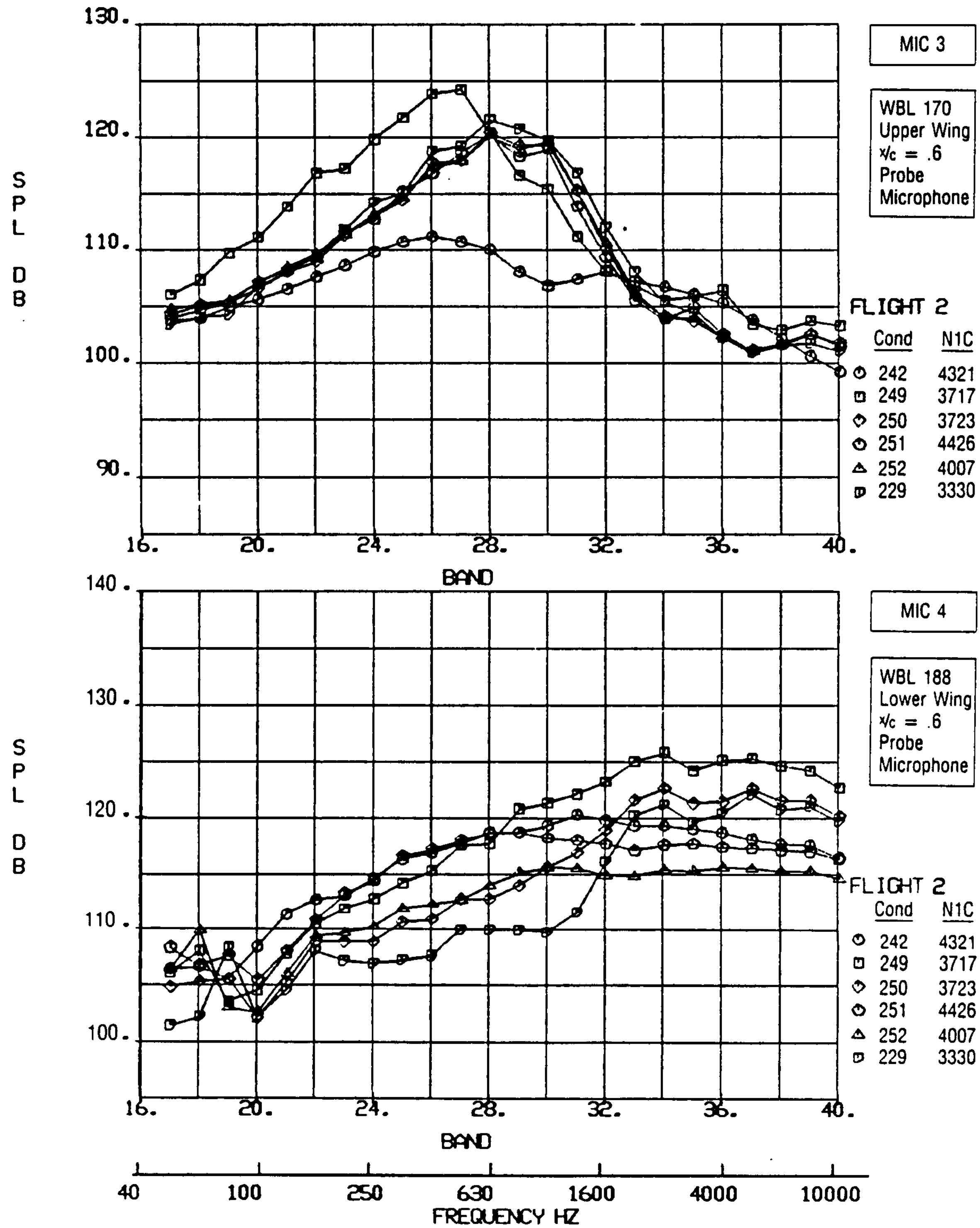


Figure 5-156. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

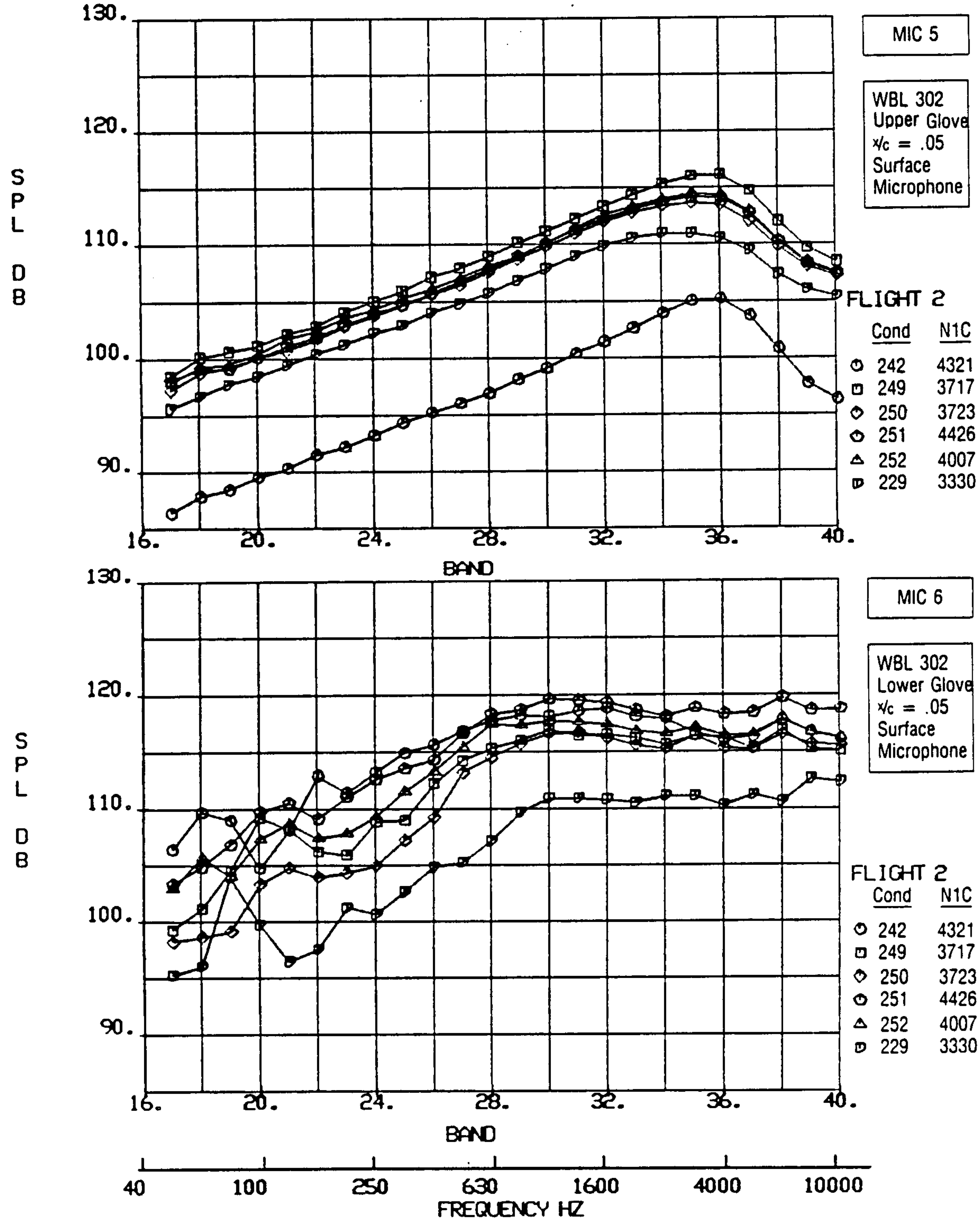


Figure 5-157. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

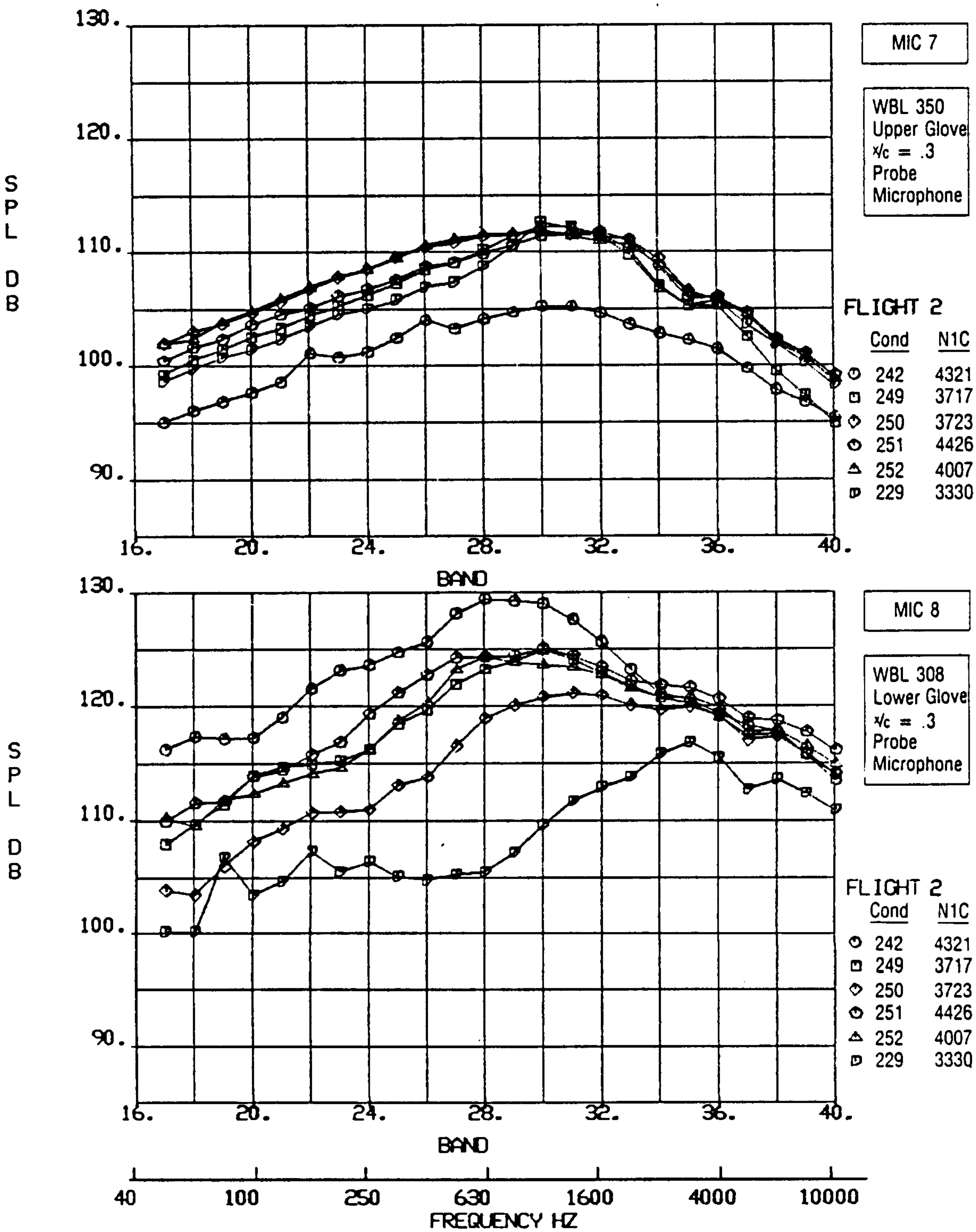


Figure 5-158. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

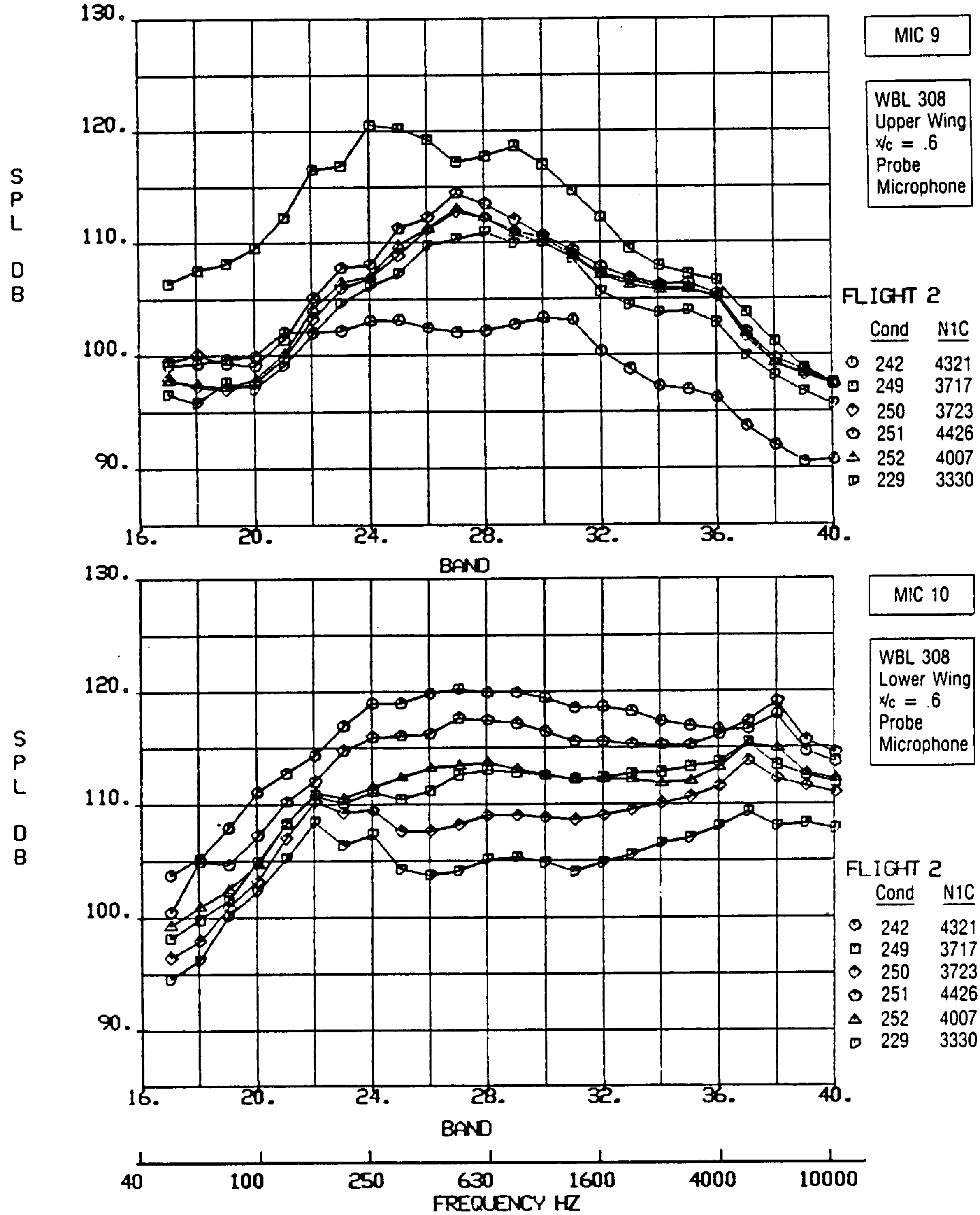


Figure 5-159. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

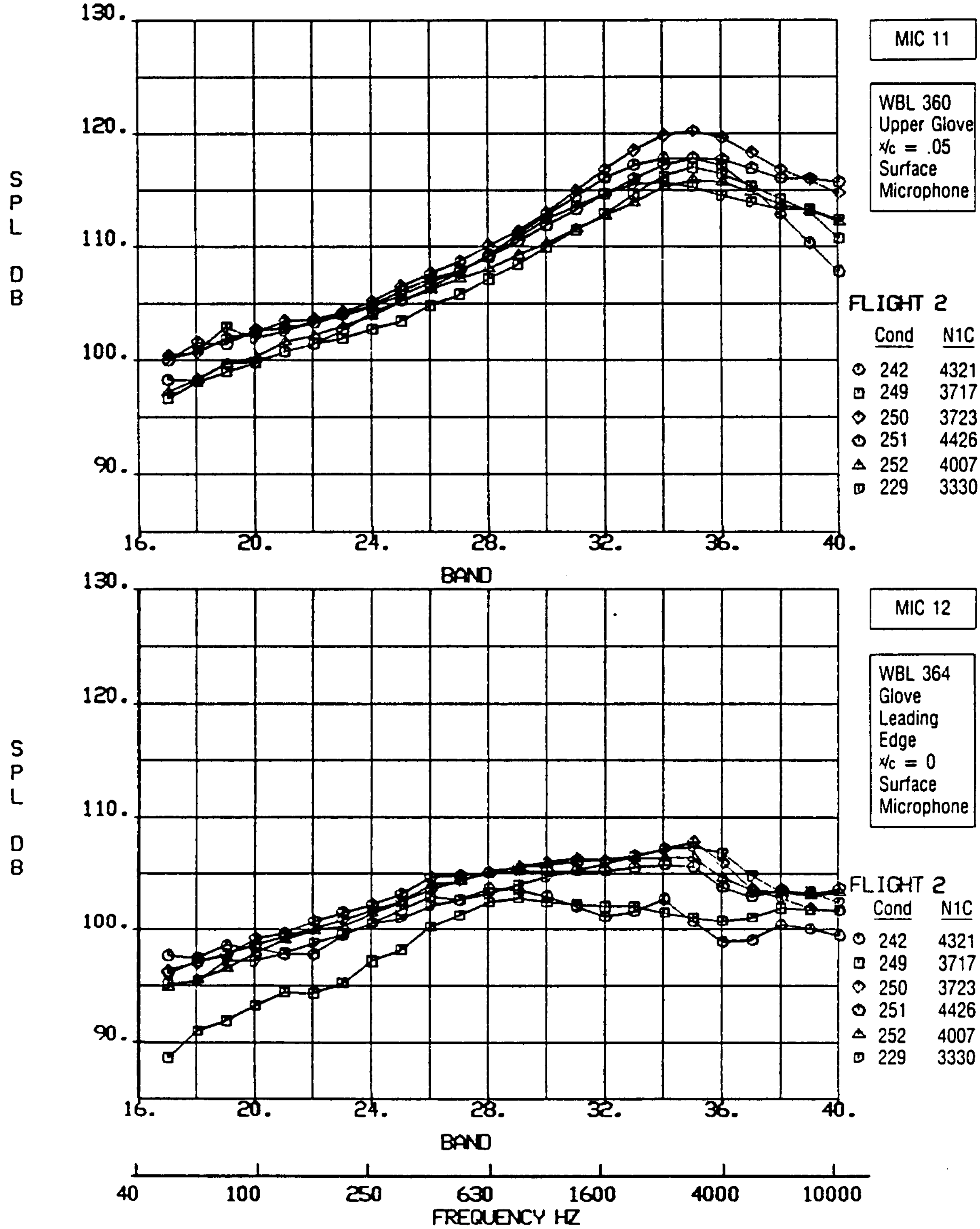


Figure 5-160. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

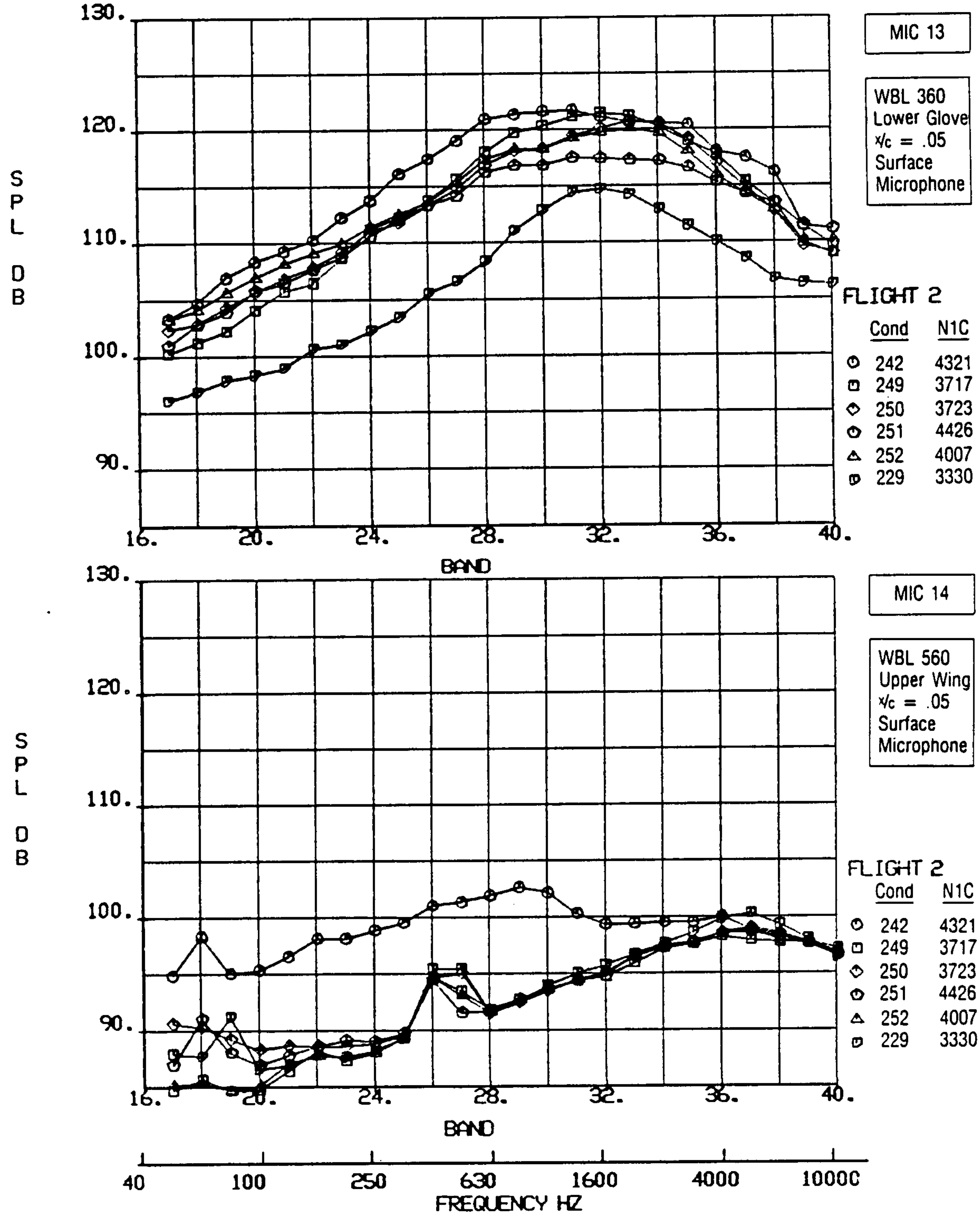


Figure 5-161. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

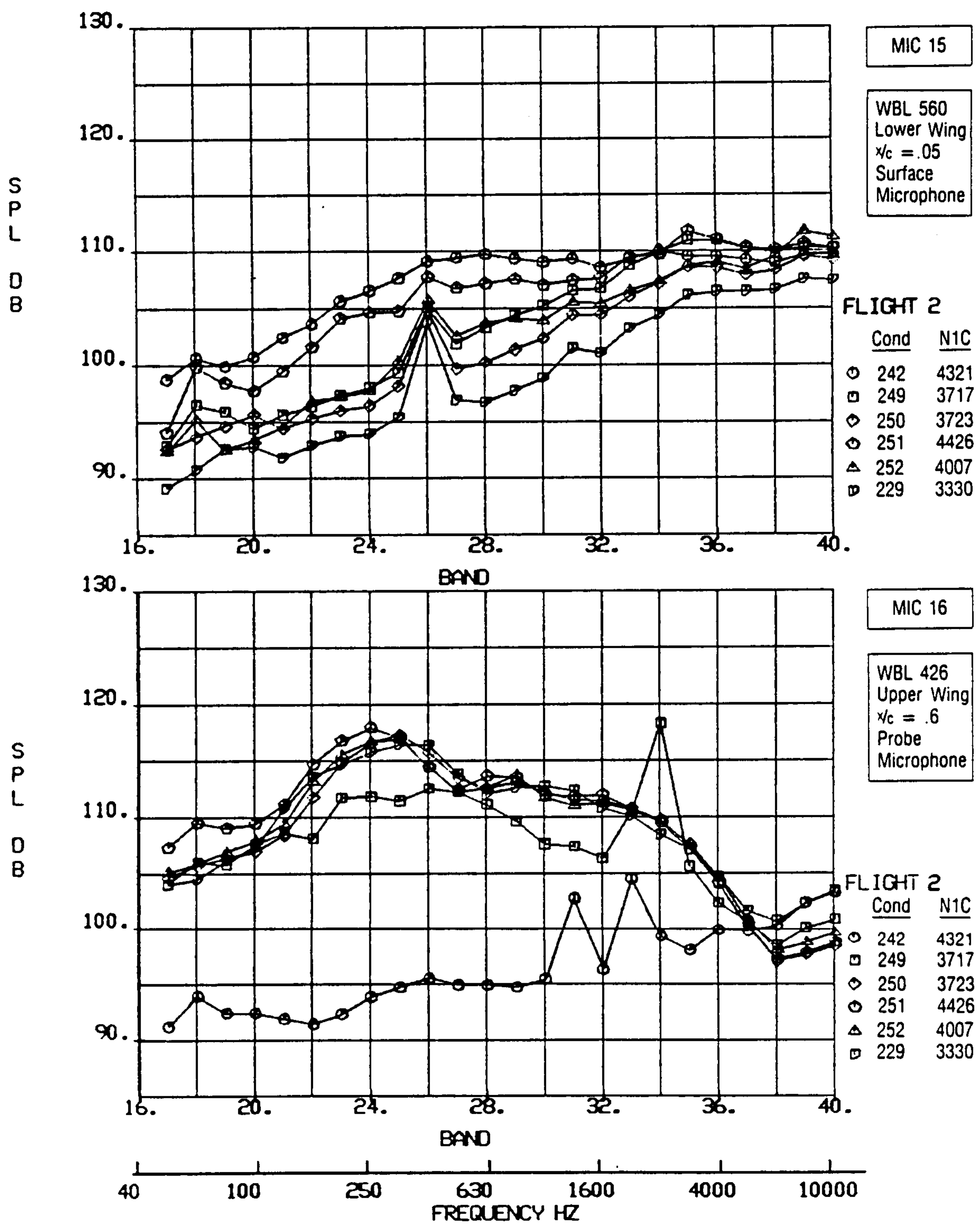


Figure 5-162. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

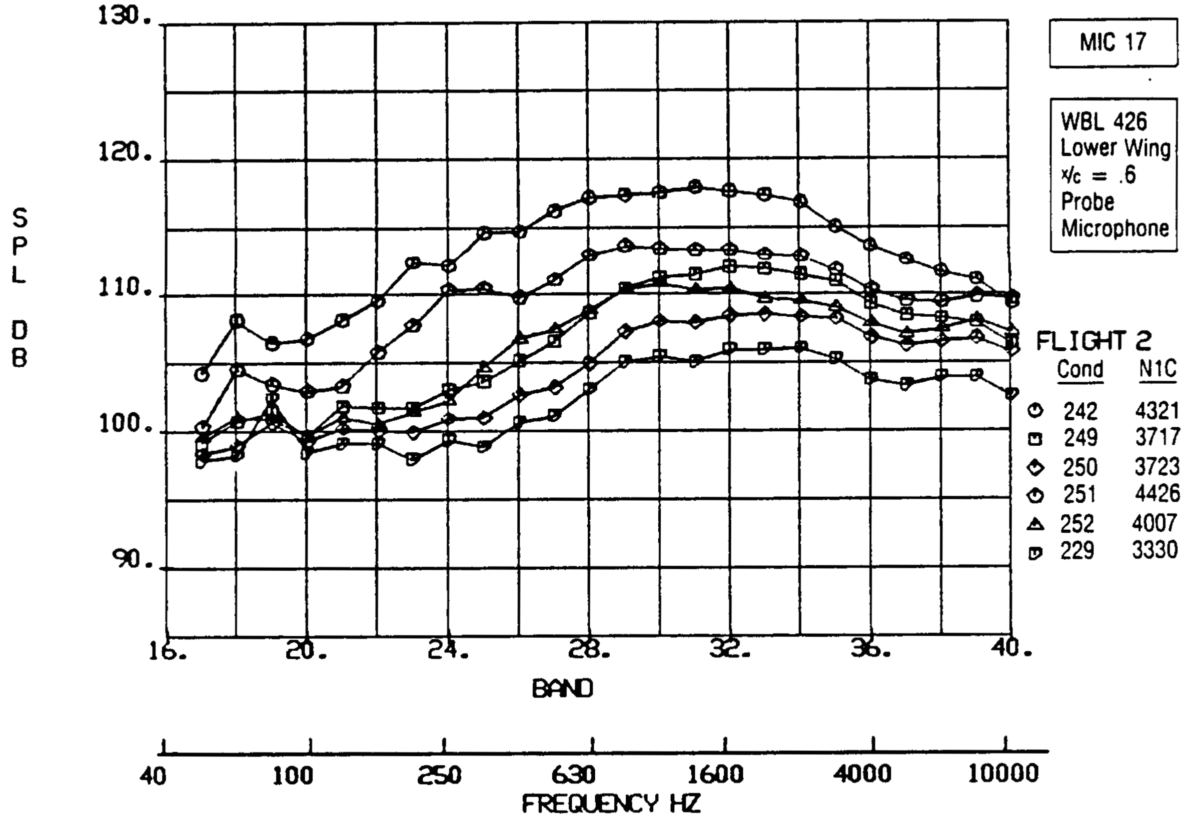


Figure 5-163. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

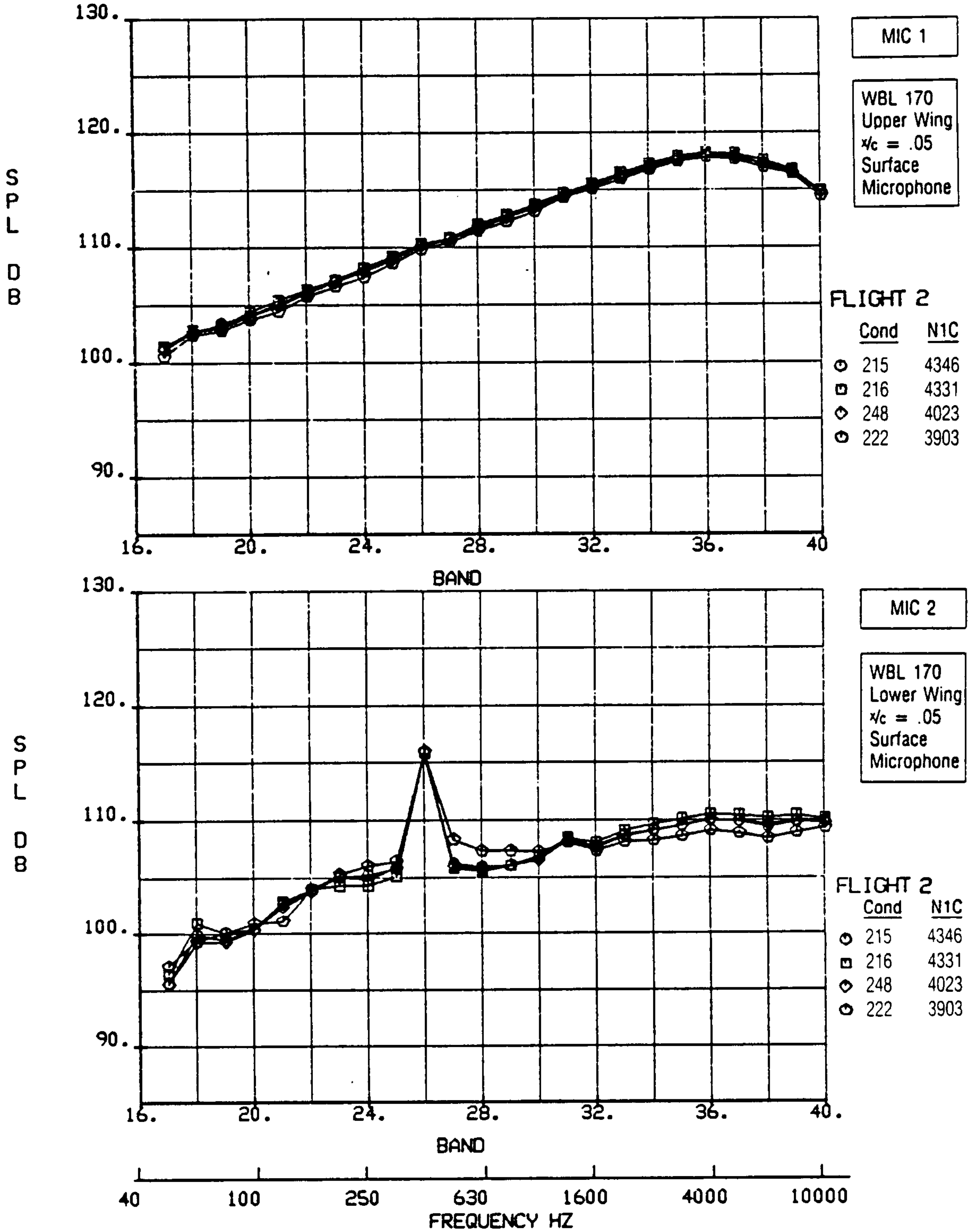


Figure 5-164. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

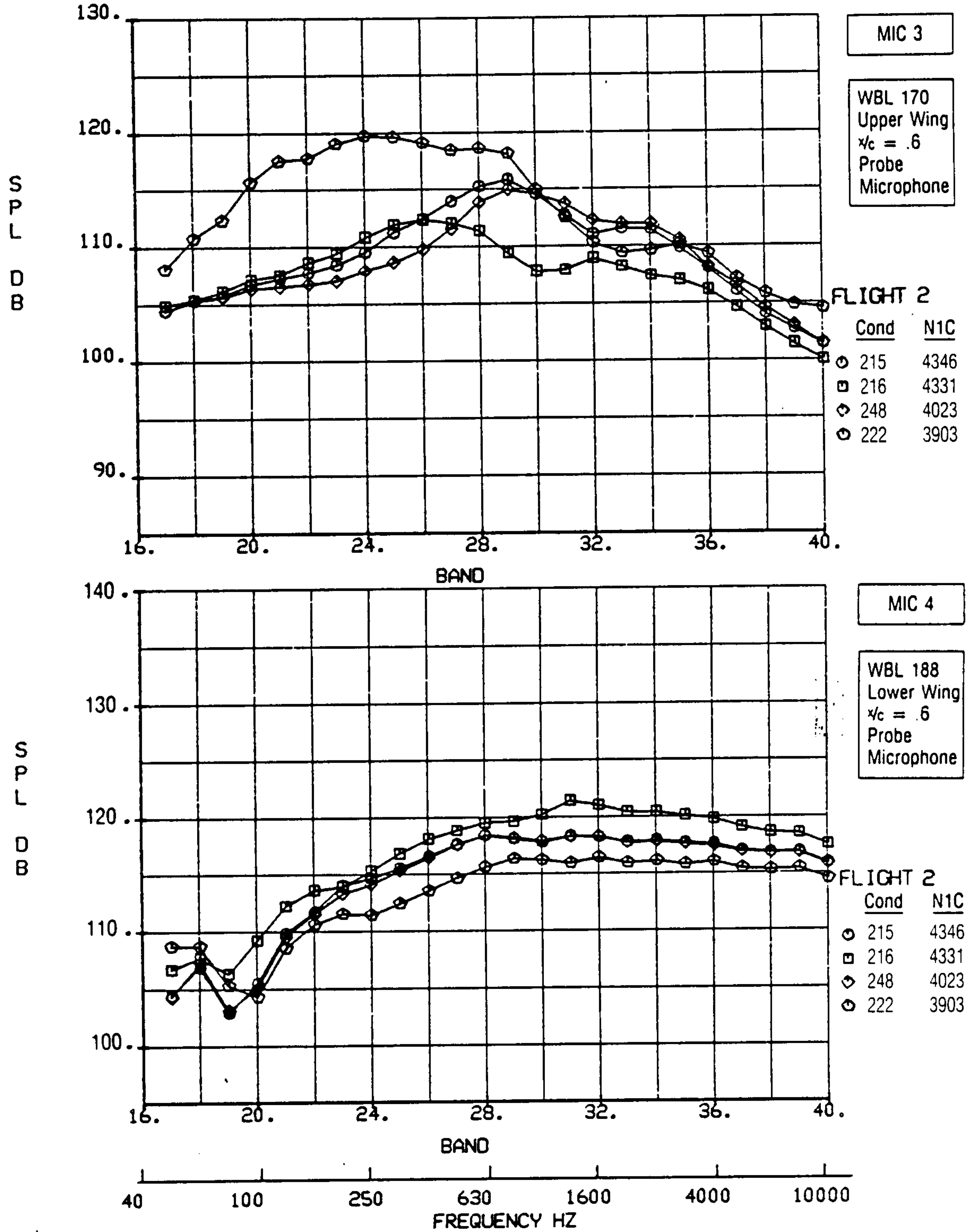
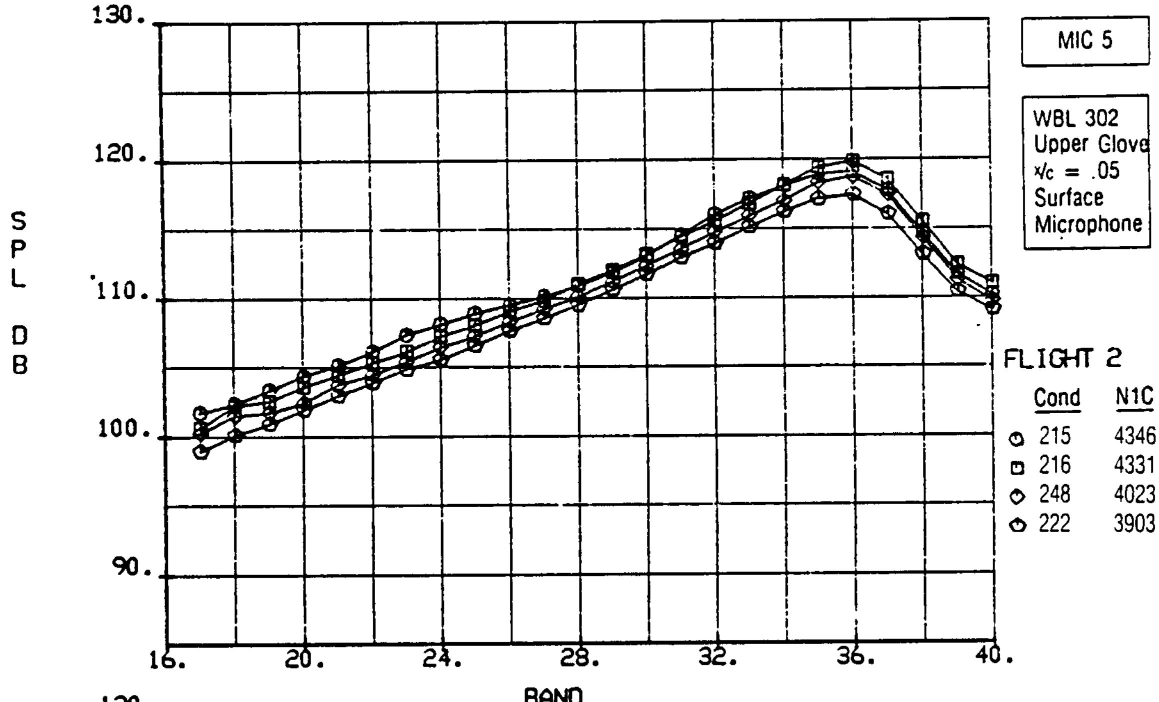


Figure 5-165. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data



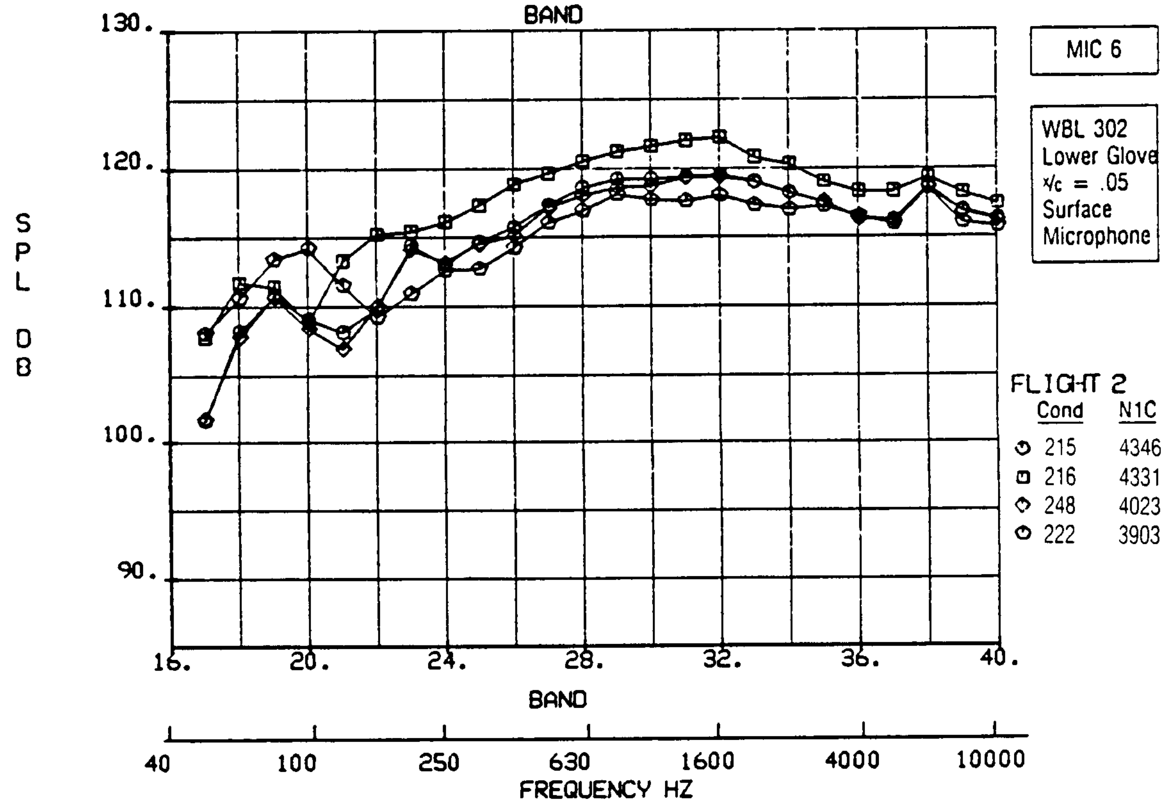


Figure 5-166. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

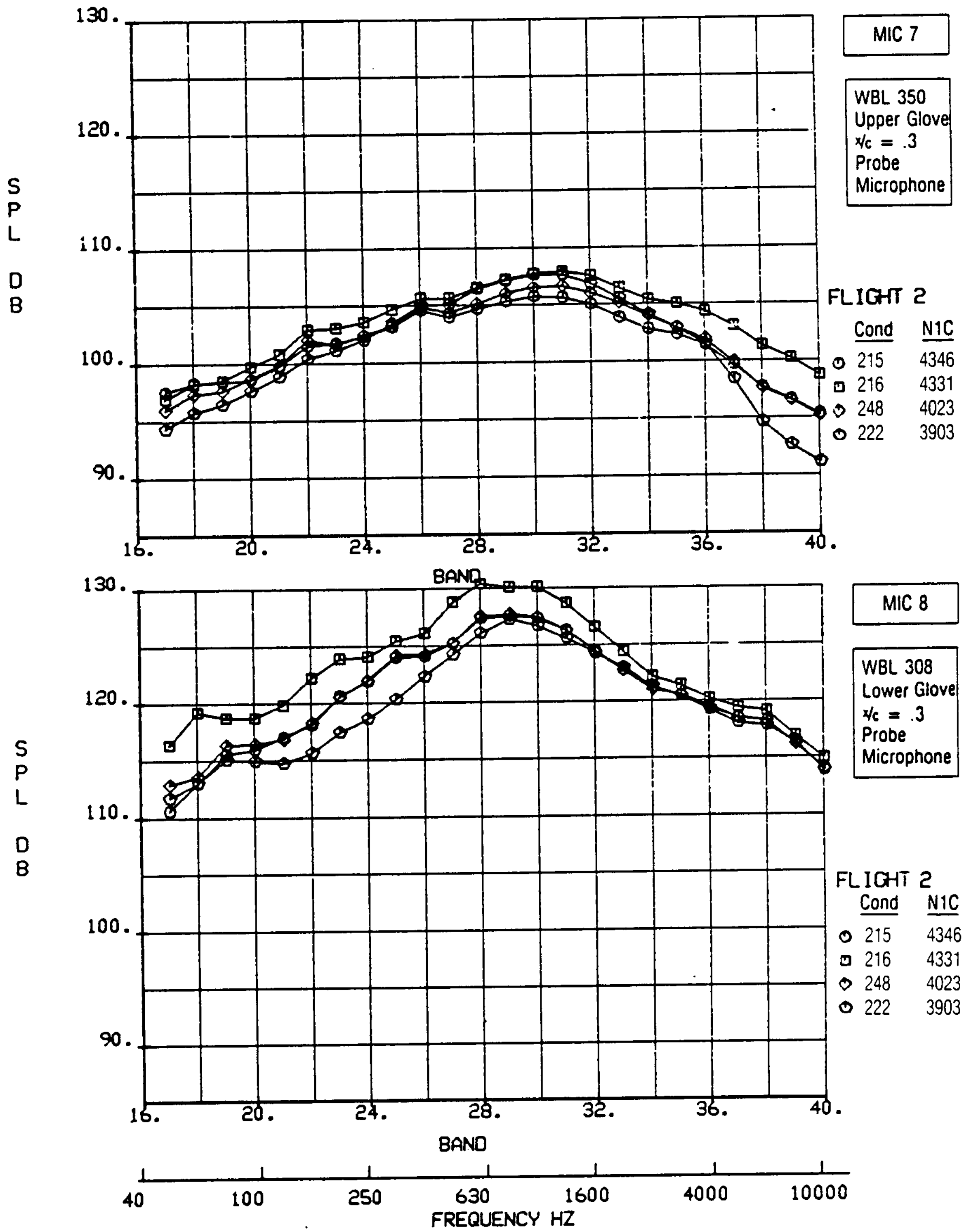


Figure 5-167. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

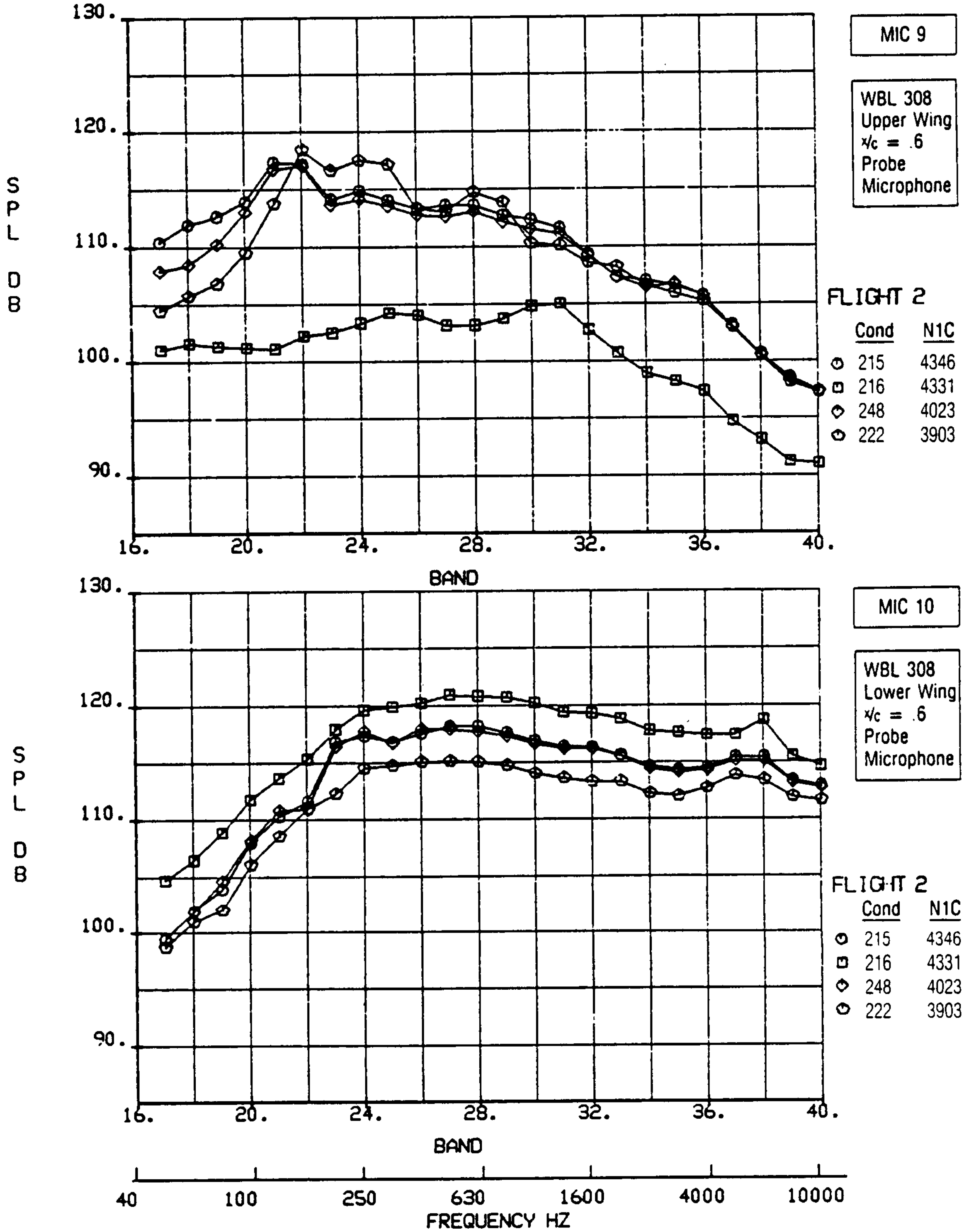


Figure 5-168. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

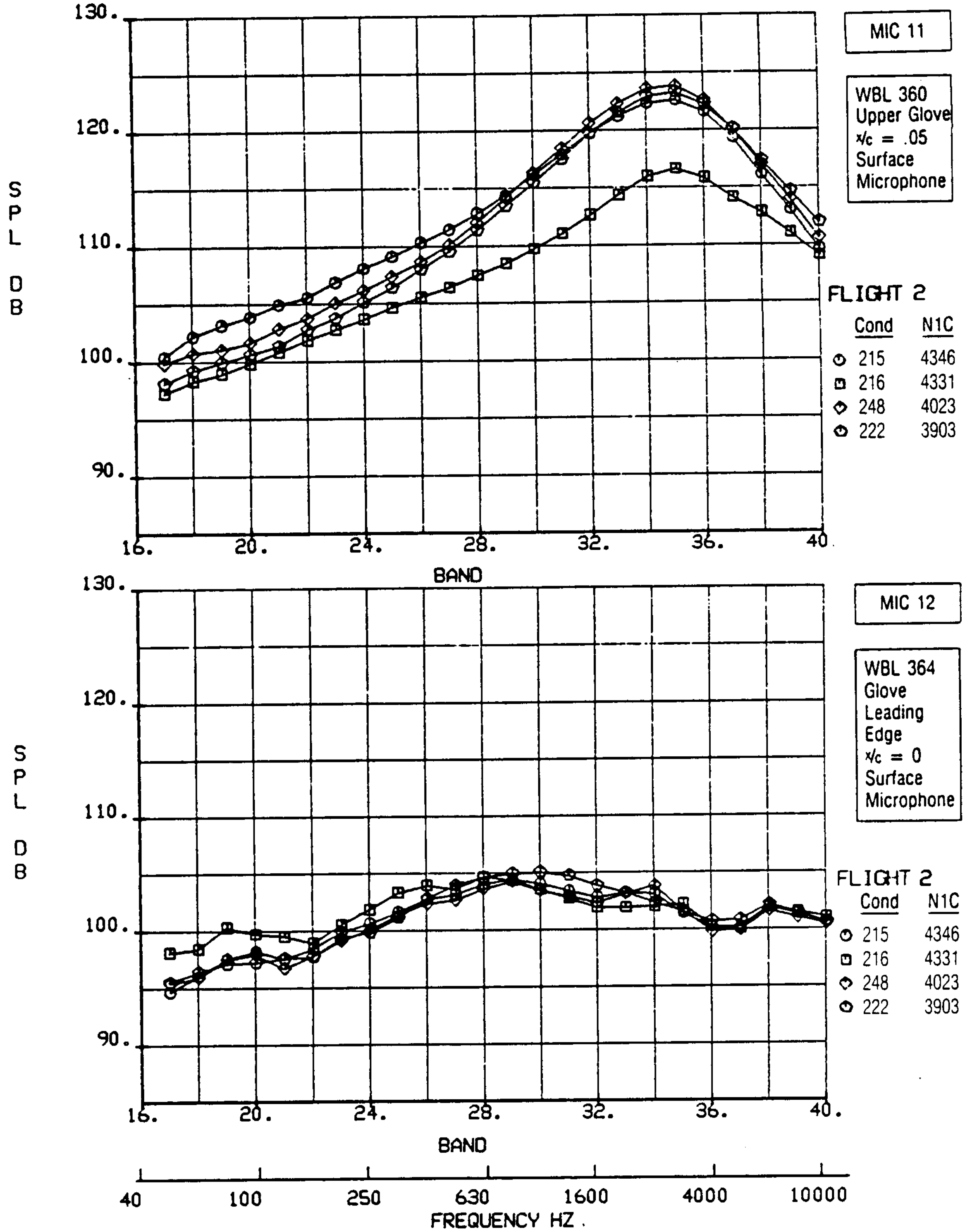


Figure 5-169. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

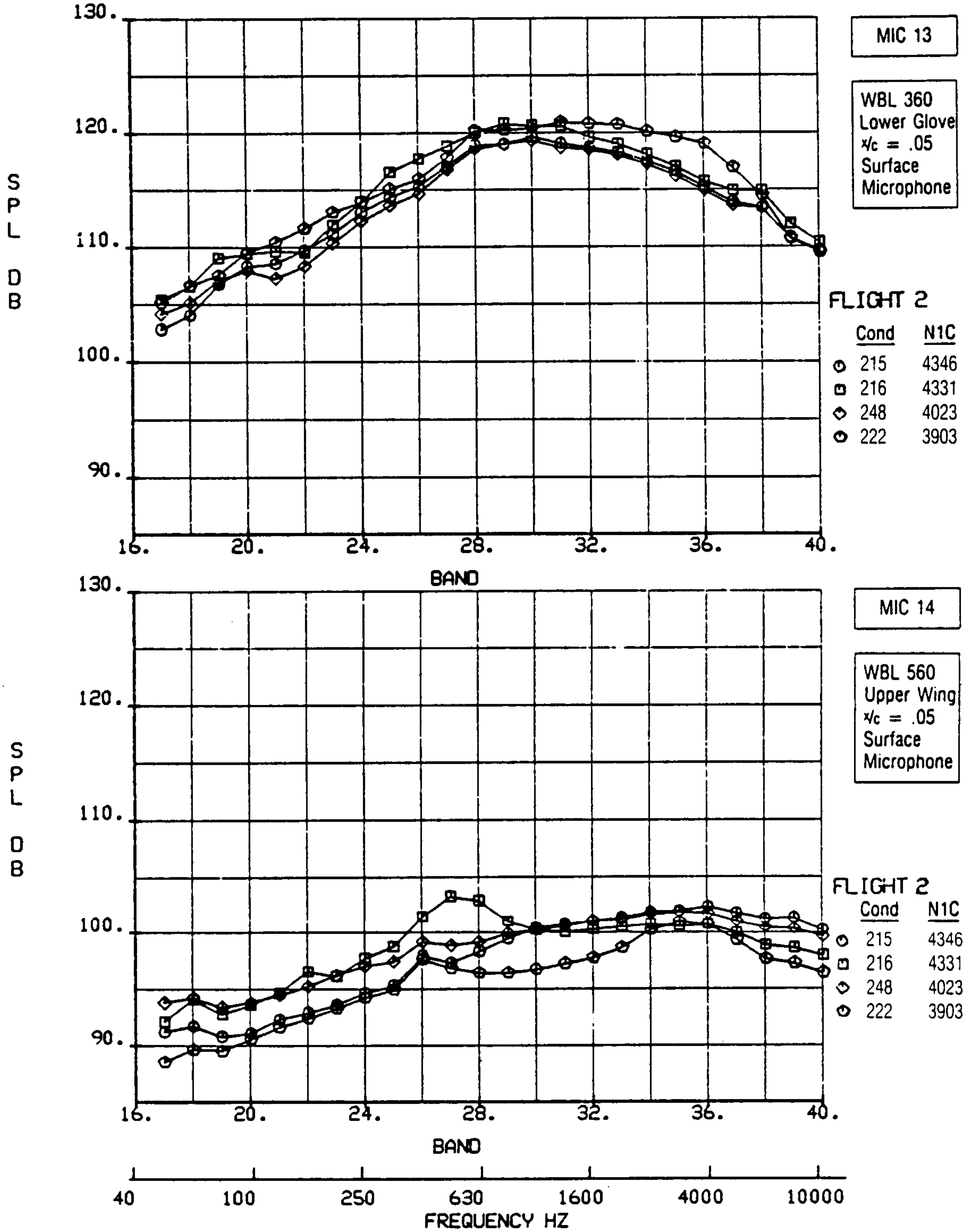


Figure 5-170. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

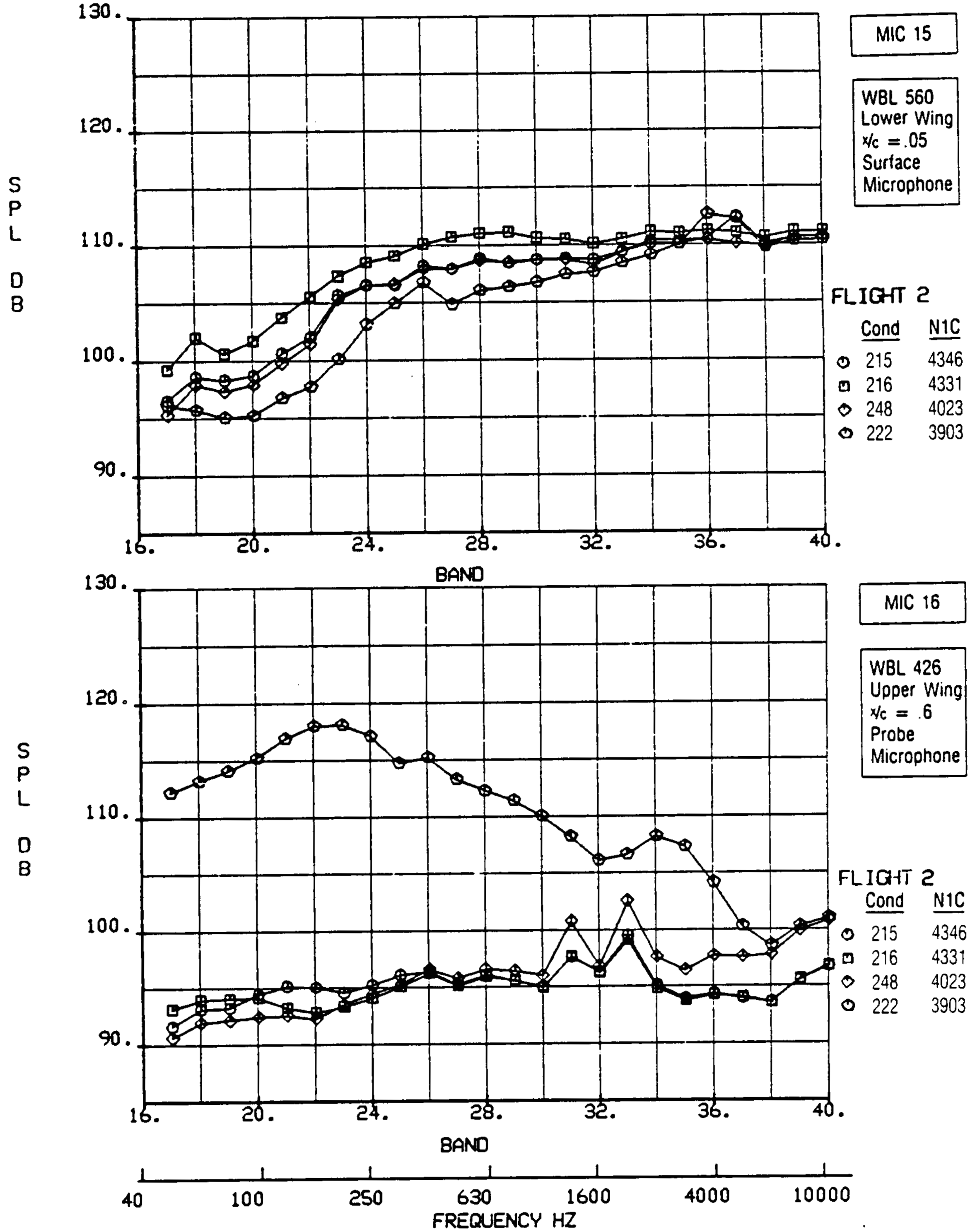


Figure 5-171. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

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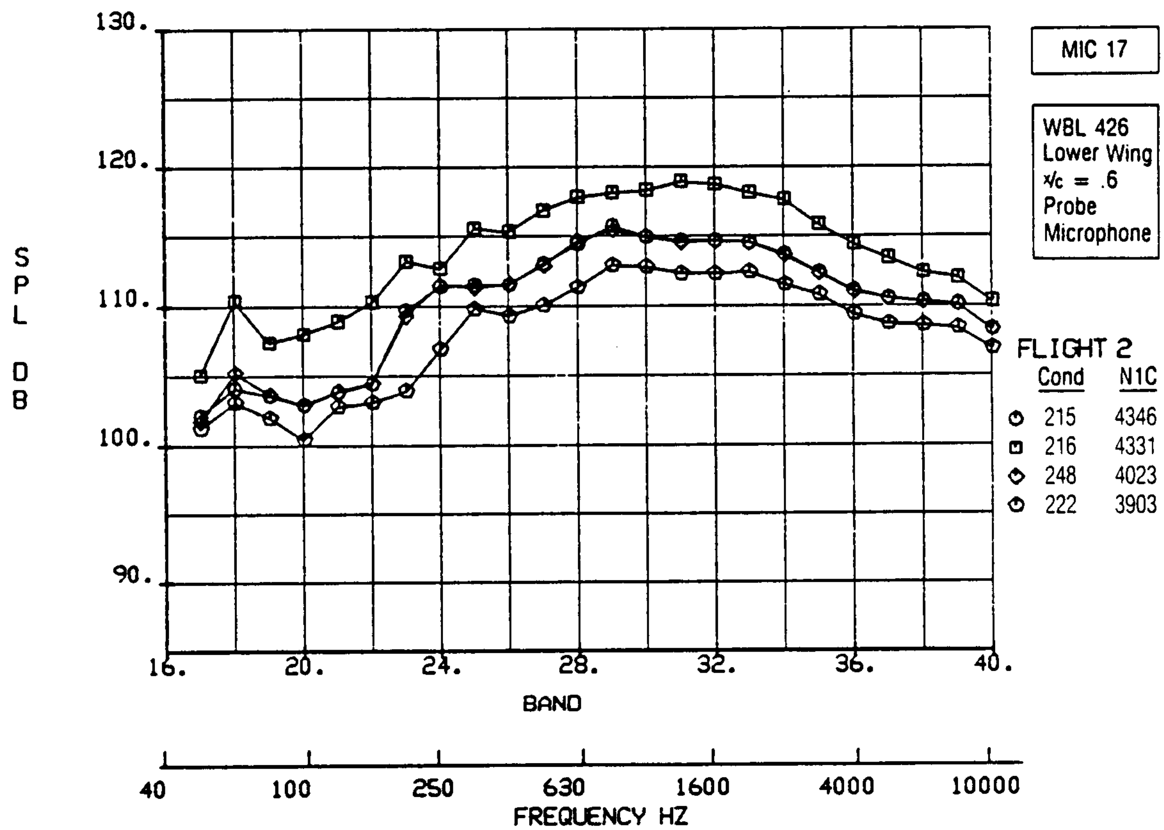


Figure 5-172. One-Third-Octave Band SPL vs Frequency, Flight 2, Category 12, Other Zero Sideslip Data

6.0 AERODYNAMIC DATA

6.1 HOT-FILM DATA

As discussed in the instrumentation section of this report (Volume 1), hot-film data of two types were recorded: (1) the fluctuating voltage and (2) the RMS voltage. The fluctuating voltage from each hot film was recorded on tape and also displayed online on an oscilloscope. Typical hot-film fluctuating voltage signals as seen on the oscilloscope are shown in Figure 6-1. The oscilloscope displays allowed immediate determination of the boundary layer transition location during each flight test condition. The RMS voltage output from each hot film was recorded on the airplane data system for postflight analysis. Figures 6-2 and 6-3 show typical DC RMS output values plotted versus chordwise location. The outputs from regions of laminar flow are characterized by low RMS voltages that are typically 15 mV or lower. The location of transition from laminar to turbulent flow is characterized by a fairly narrow peak in the RMS voltages. Downstream of the peak, the RMS voltages drop to the 20 to 80 mV level characteristic of fully turbulent flow. The values plotted in these figures are the average values for each hot-film output taken over the time period of the flight condition. In the tabulation of the hot-film data given later in this section, the average, minimum, maximum, and standard deviation of the RMS hot-film voltage over the time period of each flight condition is tabulated. These additional data are useful in determining the state of the boundary layer at each hot film. The table below, which gives typical RMS output values for the various states of the boundary layer, can be used as a guide to interpret the hot-film data.

	RMS Output, mV			
	Average	Minimum	Maximum	Standard Deviation
Laminar	5 to 19	4 to 15	5 to 150	0 to 10
Intermittent	10 to 170	4 to 15	150 to 700	10 to 175
Transitional	40 to 600	10 to 450	150 to 800	10 to 200
Turbulent	20 to 80	16 to 65	30 to 400	2 to 30

It can be seen that there is significant overlap between the four types of signals. Thus, although there is a clear indication of the state of the boundary layer at each hot-film location in most of the cases tabulated later in this section, there are some cases for which the signal appears to be in an intermediate stage between two different types. For those cases, the actual time history of the output data was studied to determine the state of the boundary layer.

A number of flight conditions were affected by the presence of cirrus clouds. It was not always possible to detect these visually, but their presence resulted in most or all of the hot films ahead of transition giving an "intermittent" or "transitional" output signal. Thus, while the transition location was not always affected, the average RMS output and the maximum RMS output of the hot films ahead of transition were significantly elevated relative to laminar flow levels. In the tabulation of the hot-film data later in this section, those cases for which cirrus clouds were suspected to have been present have been noted.

6.2 STATIC PRESSURE DATA

As discussed in the instrumentation section of this report, static pressures were measured on the glove using "strip-a-tube." There were two problems with the strip-a-tube data as measured. The first

problem resulted from a blockage in the reference static pressure line to the pressure transducers in Flights 1, 2, and 3 at high altitudes. The second problem resulted from the effect of the strip-a-tube and fairing on the pressures in the leading-edge area. The pressure data plotted and tabulated for each case later in this section have all been corrected, as necessary, for the reference pressure problem. In all cases, the pressure correction was a simple shift of the pressures at all locations by the same amount. The size of the correction is noted in all cases. No corrections have been made in this section for the effect of the strip-a-tube installation on the measured pressures.

The source of the pressure measurement error in the first three flights was believed to be trapped water vapor in the line that supplied the reference static pressure to all of the transducers used to measure the glove pressures. These transducers were located in a box with controlled environment inside the wing at the rear spar near the spanwise location of the glove. The water vapor apparently condensed and froze in the reference pressure line above a certain altitude, trapping the pressure at that altitude between the transducers and the line blockage point. The transducers measured the difference between the pressure, P, at a given point on the glove and the reference static pressure, P_{ref}. Thus, at altitudes higher than that at which the line became blocked, P_{ref} was higher than it should have been, resulting in values of $P\text{-}P_{ref}$ that were lower (more negative) than they should have been. This resulted in pressure coefficients,

$$C_p = \frac{P\text{-}P_{ref}}{q_{ref}}$$

which were more negative than they should have been. Figure 6-4 shows the pressure coefficients at x/c = 0.20 on the upper and lower surfaces for Flight 2 plotted versus airplane lift coefficient, C_L. Typically, the variation of C_p with C_L should be approximately linear for the lift coefficient range of interest here. It can be seen that for lift coefficients of about 0.5 and lower (with the exception of Condition 239), the variation of C_p with C_L is approximately linear on both surfaces. The slope of the C_p versus C_L variation is very close to that of the inviscid A488 transonic code analysis. However, for lift coefficients above 0.5, there is a negative shift in both the upper and lower surface pressure coefficients, the magnitude of which increases as C_L increases. However, it is not the change in C_L that is causing the change in magnitude of the shift, but the altitude change corresponding to the C_L change. The line blockage in this case appears to have formed at an altitude between 36,000 and 38,000 ft. For the later test conditions (with the exception of Condition 239), altitude is increasing as C_L increases. Thus, the difference between the correct reference pressure and the trapped reference pressure is increasing as altitude and C_L increase. Apparently, however, the blockage in the reference pressure line was not quite total. This can be seen by comparing two pairs of data points. First, if Condition 223 is adjusted based on the difference in atmospheric pressure between it and Condition 211, the adjusted C_p value would be about -0.85, which is low based on the expected linear variation. This indicates that there was some reduction in pressure in the reference line between Conditions 211 and 223. Second, comparing Conditions 239 and 211, it can be seen that both correspond to an altitude of 38,000 ft, yet the C_p for Condition 239 is significantly lower than expected. This can be explained by noting that Condition 239 followed a long series of conditions ranging from 39,000 to 41,000 ft. With a blockage in the reference pressure line that was very nearly a total blockage, the effective reference pressure, would eventually relax to the correct reference pressure at the corresponding altitude given enough time. Thus, the effective reference pressure for Condition 239 corresponded to that of an altitude higher than 38,000 ft and was, therefore, too low. This resulted in a C_p that was more positive than expected.

Attempts to correct the reference pressure problem were not successful until a rerouting and shortening of pressure lines was accomplished prior to Flight 4. Figure 6-5 shows a plot of C_p versus C_L for the M = 0.80 conditions of that flight at x/c = 0.20. It should be noted that these pressures are at the outboard glove station, WBL 353. It can be seen that the variation of C_p with C_L is approximately linear, as it should be. This indicates that the reference pressure line remained clear during the entire flight.

The pressures tabulated later in this section for Flights 1 and 2 include corrections to the measured data that were determined by estimating corrections to the reference pressures according to the following procedure.

Figure 6-4 shows that the variation of C_p at x/c = 0.20 with lift coefficient follows the analytically predicted (A488) trend up to an altitude of 36,000 to 38,000 ft but with a shift in level. Thus, for present purposes it can be expected that the C_p at the x/c = 0.20 location would closely follow the analytical trends for other combinations of C_L and Mach number. Within acceptable limits, this assumption provides a basis for estimating the true test data trends by estimating a correction to the reference pressure. A C_p correction schedule is established by taking the difference between the measured (but erroneous) C_p at x/c = 0.20 and the estimated true test value for each flight condition. With this schedule, all the C_p values can be corrected regardless of chordwise position or flight condition. It should be noted that in all cases there will be no change to the measured shape of the pressure distribution since the same correction was applied to all of the ports on both surfaces.

The Flight 3 data was corrected in a different manner. On that flight, in an effort to determine the source of the problem, the upper-surface Port 5 pressure (x/c = 0.20) was measured in two ways. The first was the normal method by which all previous glove pressures had been measured, including the use of the reference pressure line from the body to the controlled-environment box in the wing that contained the pressure transducers. The second method of measurement was to tap into the Port 5 pressure line and route it into the airplane where it was measured relative to the airplane reference pressure. The difference between these two measurements of the Port 5 pressure was zero until Condition 6, which was at an altitude of 34,700 ft.

For that condition, the pressure differential measured onboard the airplane was 0.692 lb/in^2 higher than that measured using the normal method. This indicated that the reference pressure, against which all of the glove pressures were being measured, was 0.692 lb/in^2 too high. However, direct measurement of the reference pressure error allowed the measured glove pressures to be corrected. Based on the measured dynamic pressure, q, for Condition 6 of 1.602 lb/in^2, for example, the correction applied to the measured pressure coefficients on the glove was ΔC_p = 0.692/1.602 = 0.432 for Condition 6.

The difference between the two Port 5 pressure differential measurements was also used to correct the measured glove pressures for Conditions 6.1 through 13 and Conditions 31 through 38. For Conditions 14 through 30, because of the high altitudes, the Port 5 pressure differential measured in the normal manner exceeded the 2-lb/in^2 limit of the transducer. Therefore, the exact error in the reference pressure could not be determined. For these cases, the pressure differential for many of the other upper surface ports also exceeds the 2-lb/in^2 transducer limit. Therefore, for these cases the pressures plotted and tabulated later in this section are from Flight 4, for which the identical conditions were flown.

The Port 5 results from Flight 3 showed that the pressure measurement problem was definitely attributable to plugging of the reference pressure line going out to the transducer box in the wing. So, for Flight 4, that line was shortened and rerouted and carefully purged to eliminate any possibility of trapped water vapor. Flight 4, except for the last two conditions, was a condition-by-condition repeat of Flight 3 to obtain valid pressure data. Since there were no reference pressure problems for Flight 4, the data plotted and tabulated later in this section are exactly what were measured. This also establishes the existence of plugging on previous flights and supports the basis for making reference pressure corrections for Flights 1 and 2.

Another concern with the glove pressures was the effect of the strip-a-tube and fairing on the pressures in the leading-edge region. Because the strip-a-tube was not wrapped continuously from the upper surface around to the lower surface, its presence produced a bump in the airfoil contour that could be expected to have some effect on the measured pressures. The largest effect was immediately ahead of the forward end of the strip-a-tube, where magic bond was used to fair out the 0.188-in thickness of the strip-a-tube over a distance of about an inch. It was expected that any effect of the strip-a-tube pressures would be confined primarily to the first two pressure ports, which were 2 and 8 in, respectively, aft of the forward end of the magic-bond fairing. In order to determine the magnitude of this effect, two steps were taken. First, for Flight 4, on the glove upper surface the most forward part of the strip-a-tube (3-tube width) (refer to fig. 6-3 in the instrumentation section of Volume 1) was recessed into the surface so that it was essentially flush for flight. The expectation was that this would result in a pressure measurement

very close to that which exists on the undisturbed glove surface for Port 1 at the expense of a possible increased effect at the Port 2 location.

By comparing the pressure measurements from identical conditions for Flights 3 and 4, the effect of recessing the strip-a-tube can be seen. Figure 6-6 shows that the effects are a function of lift coefficient and possibly Mach number. The ΔC_p shown for Port 2 is the amount by which the Flight 4 pressures are too negative because of the effect of recessing the forward part of the strip-a-tube and moving the point of maximum curvature back closer to port 2. For a given condition, the most accurate measured pressures would consist of the Port 1 pressure from Flight 4 and the Port 2 pressures from Flight 3. Aft of Port 2 the pressures from both flights are essentially the same. This is the approach that was used for the pressure plots in the aerodynamic data analysis section of Volume I of this report for WBL 353.

A second additional check on the effect of the strip-a-tube and fairing was made in a wind-tunnel test of the strip-a-tube installation after completion of the flight testing. In this test, conducted in the Boeing Transonic Wind Tunnel, two pressure belts were mounted on an island fairing as shown in Figure 6-7. The top belt served as the reference and had its fairing 12 in forward of the second belt. The second or test belt had a fairing similar to that used on the glove and had four pressure ports, the first and third of which were in locations identical to those of the first and second ports on the glove. The ports in the reference belt were at the same stations as those on the second belt, but far enough away from both belt fairings to be essentially unaffected by their presence. The pressure coefficients plotted are those of the test belt relative to the reference belt. They show that at the highest Mach numbers the effect of strip-a-tube leading-edge fairing on the first port, which corresponds to Port 1 on the glove, is to change the measured pressure coefficient by -0.2. The effect on the third port, which corresponds to Port 2 on the glove, is much smaller being about -0.03. The results for the first port essentially agree with the difference in pressures at Port 1 on the glove between Flight 3 and Flight 4. The results for the third port indicate that the Port 2 pressures on the glove for Flights 1, 2, and 3 are probably only slightly more negative than the value that would exist in the absence of the strip-a-tube.

6.3 FLIGHT TEST DATA SUMMARIES

Tables 6-1 through 6-4 summarize the flight conditions and measured transition locations for each of the four flights. It should be noted that the primary purpose of Flight 4 was to obtain pressure data, as previously discussed in this section. An insect-protection cover was not used for that flight. As a result, the amount of laminar flow at the inboard row of hot films on the upper surface is less than for the same condition on Flight 3. Therefore, it is recommended that transition data from Flight 3 be given preference over that from Flight 4 for all conditions that were tested in both flights.

6.4 FLIGHT TEST DATA PLOTS AND TABULATION

Following the flight test data summaries are pressure plots and hot-film data tabulations for all of the flight conditions tested. The plotted pressure coefficients for conditions from Flights 1, 2, and 3 have been corrected for the reference pressure problem, as described earlier in this section. The size of the pressure adjustment made to the data as measured is noted in each case. Also shown for each condition are plan views of the upper and lower glove surfaces showing the state of the boundary layer at each hot-film location. Finally, the RMS output data from each hot film is tabulated. The values tabulated are the average, minimum, maximum, and standard deviations of the values measured during the minute or so that data was taken for each test condition.

6.4.1 Flight 1 Data Summary

Figures 6-8 through 6-20 display pressure distribution data on the glove and information relative to the state of the boundary layer for each condition for which data was obtained for Flight 1. This was the initial flight for the program and it was not completed because of adverse weather conditions — mainly cirrus clouds.

6.4.2 Flight 2 Data Summary

Figures 6-21 through 6-69 display pressure distribution data on the glove and information relative to the state of the boundary layer for each condition for which data was obtained for Flight 2. This flight

accomplished the basic objectives of the program covering all flight conditions originally planned and special conditions required to evaluate situations of interest.

6.4.3 Flight 3 Data Summary

Figures 6-70 through 6-109 display pressure distribution data on the glove and information relative to the state of the boundary layer for each condition for which was data was obtained for Flight 3. This flight was conducted to provide a better definition of the aerodynamic characteristics of the glove. It did not include noise measurements since the previous flights had covered the entire range of conditions for Flights 3 and 4.

6.4.4 Flight 4 Data Summary

Figures 6-110 through 6-146 display pressure distribution data on the glove and information relative to the state of the boundary layer for each condition for which data was obtained for Flight 4. This flight was conducted to obtain pressure data free of the ambiguities that existed during previous flights due to erroneous reference pressure levels. This was found to be due to freezing of condensed water vapor in the reference pressure line, which was eliminated in Flight 4 by rerouting of the line and careful purging.

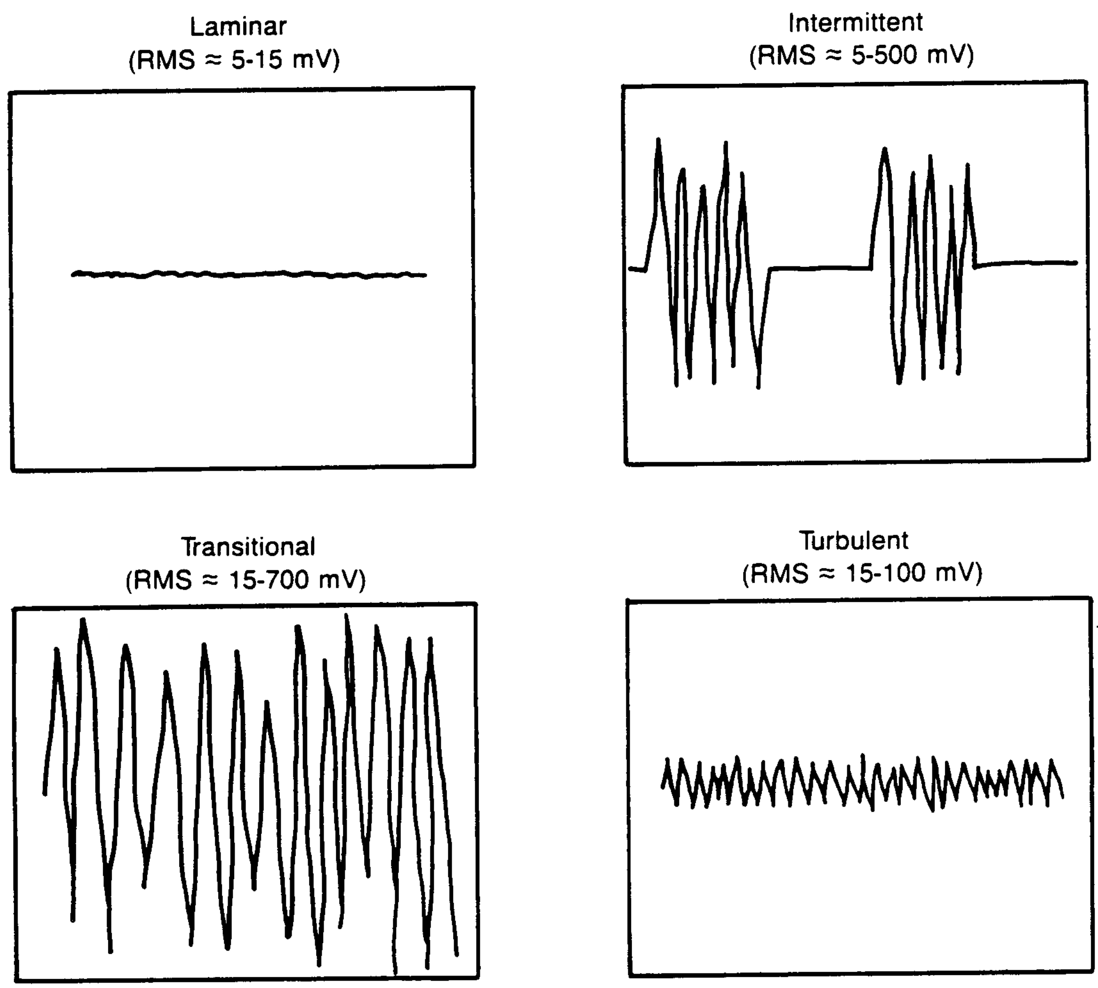


Figure 6-1. Typical Hot-Film Response to Airflow (Fluctuating Output)

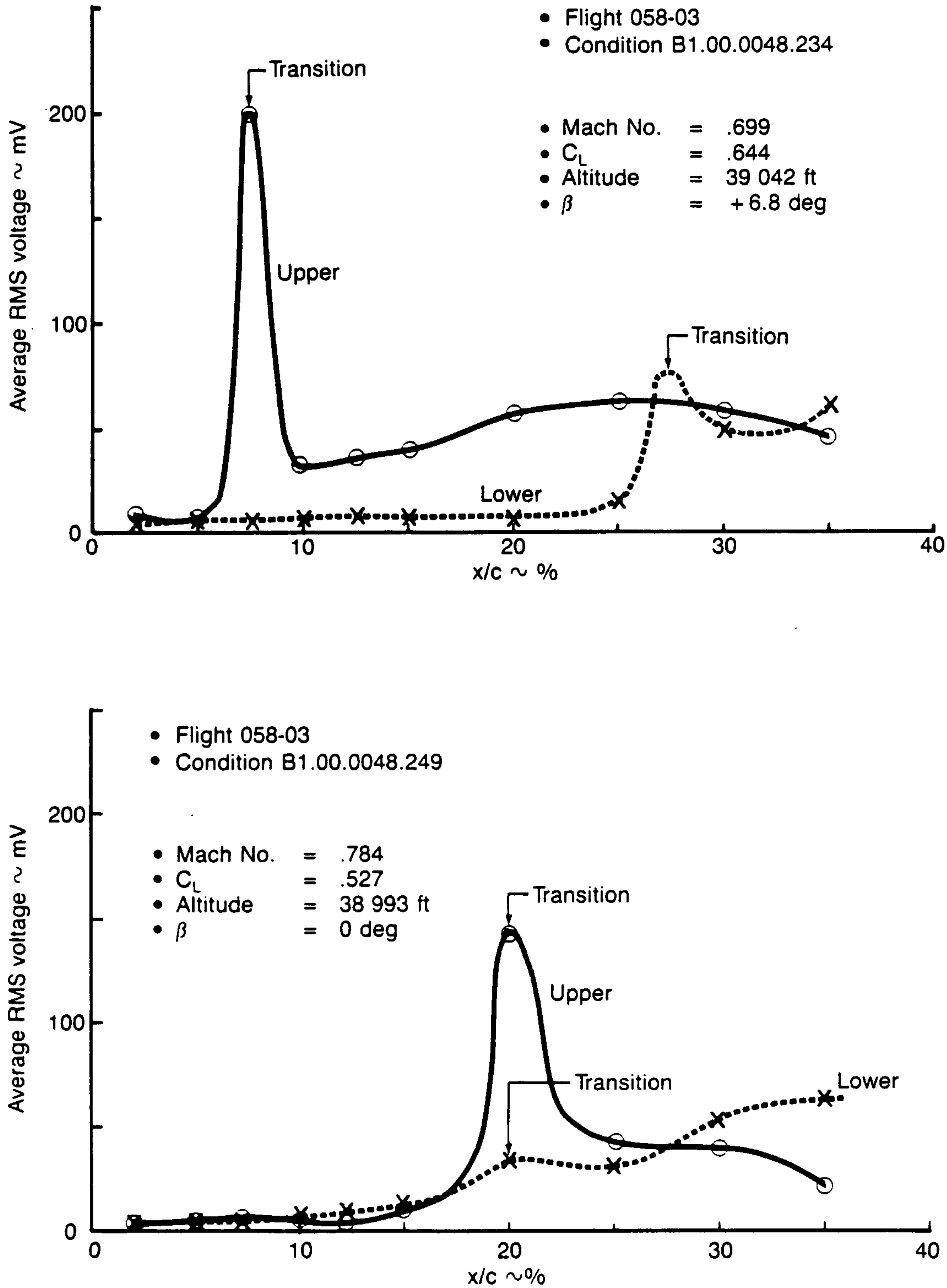


Figure 6-2. Sample Hot-Film Output

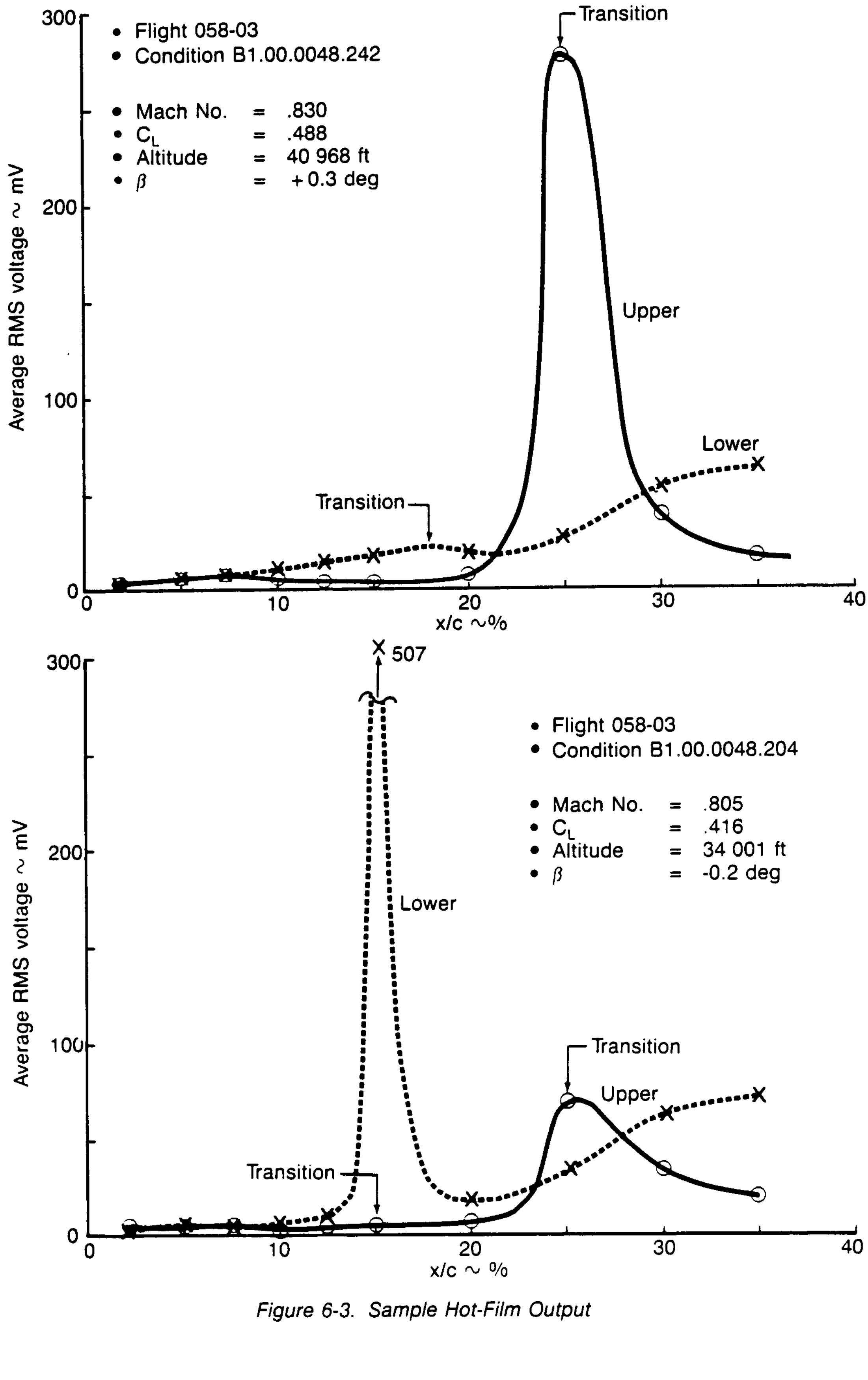


Figure 6-3. Sample Hot-Film Output

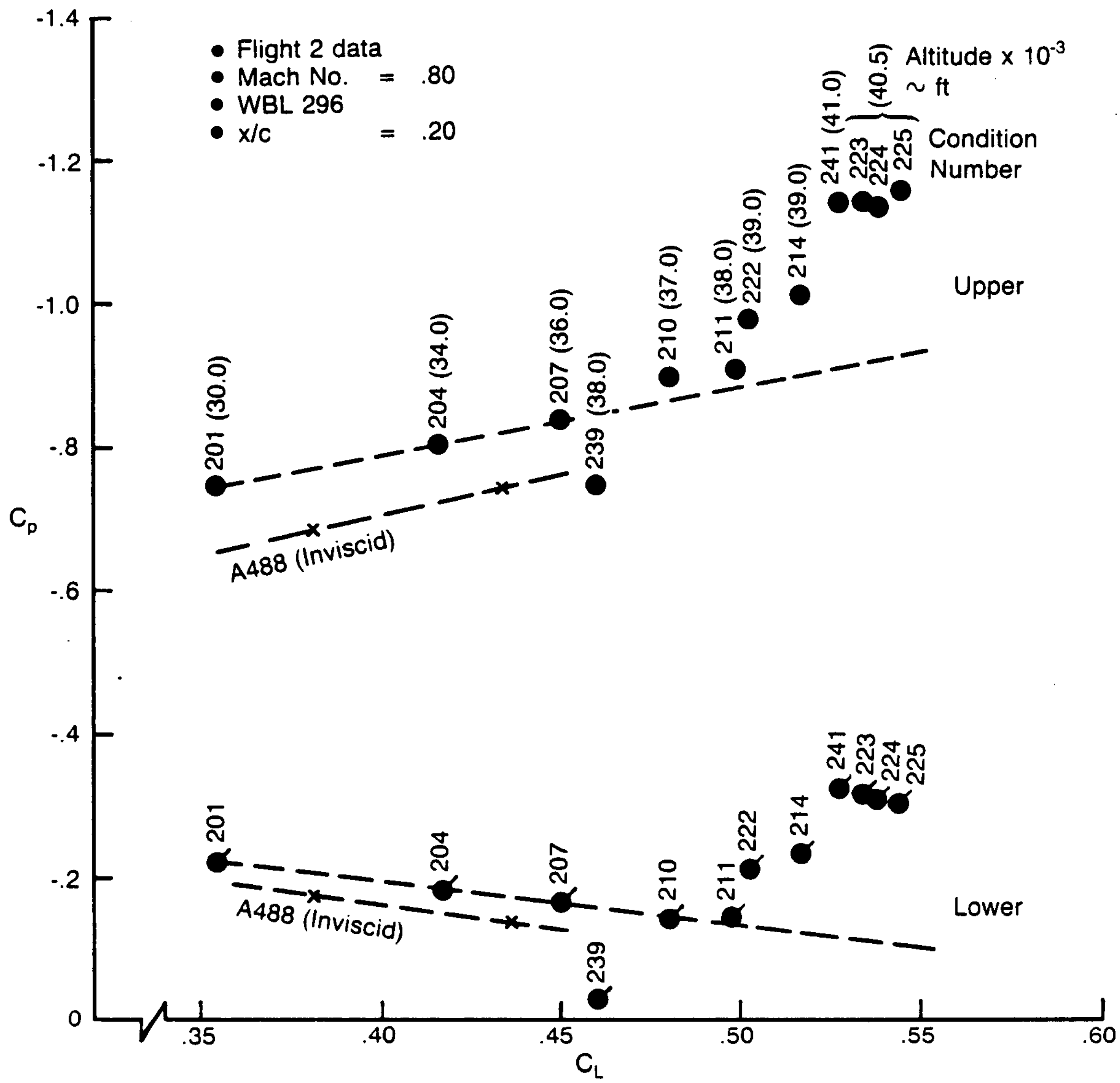


Figure 6-4. Surface Pressure Variation With C_L at x/c = 0.20, Flight 2

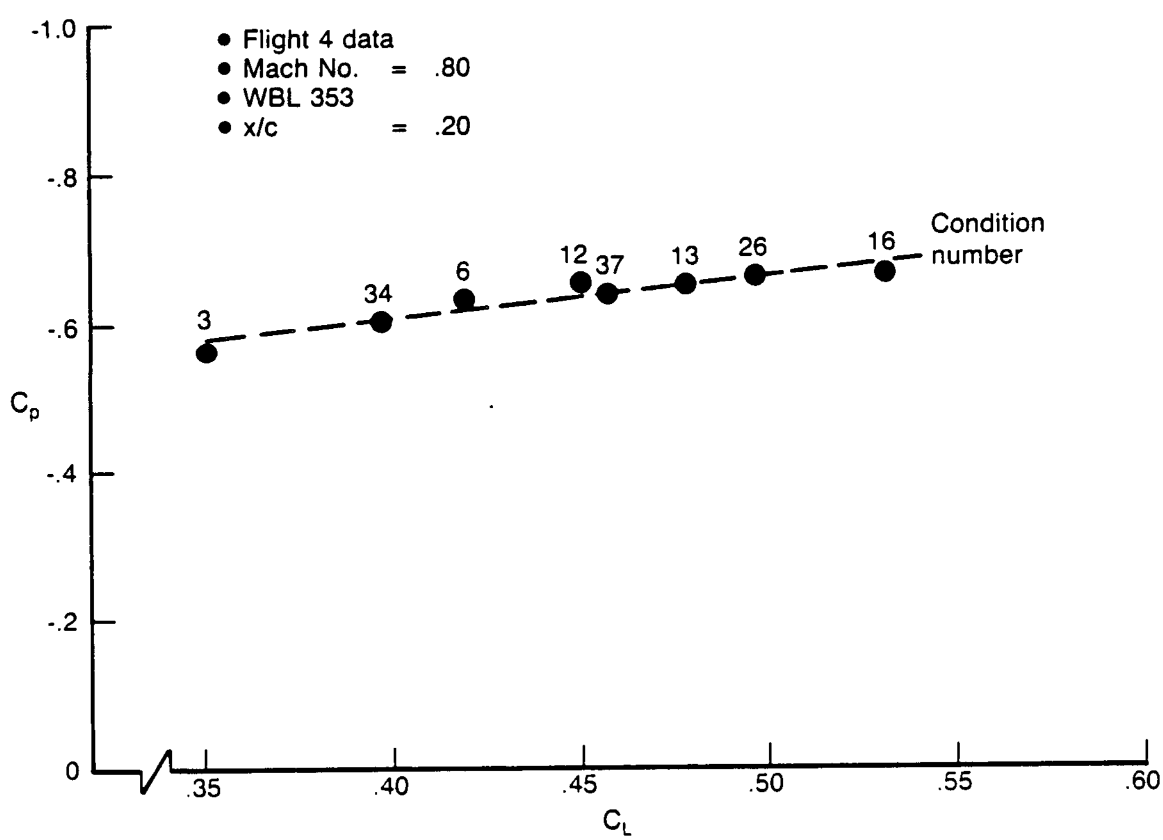


Figure 6-5. Surface Pressure Variation With C_L at x/c = 0.20, Flight 4

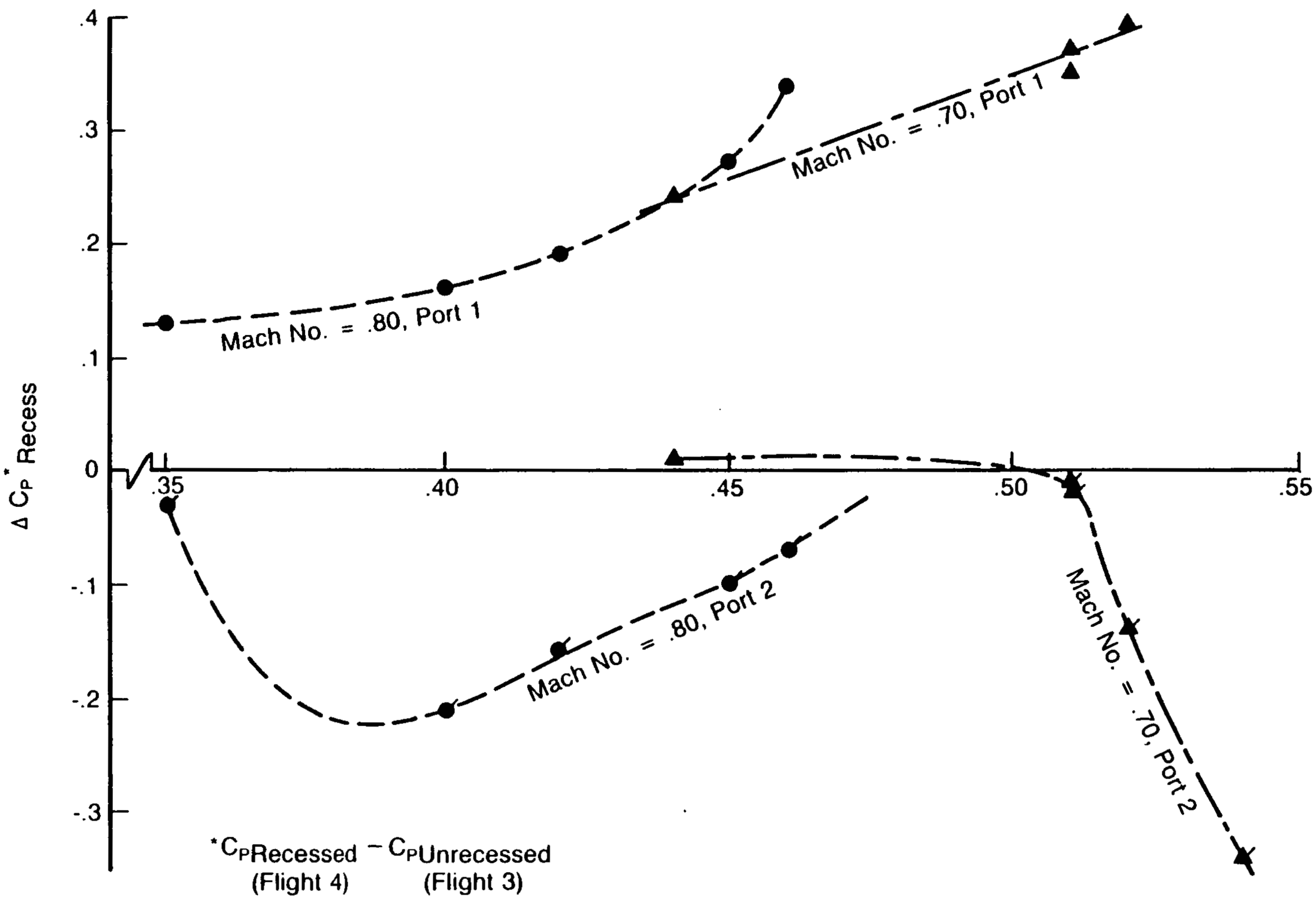


Figure 6-6. Effect of Recessing Strip-a-Tube

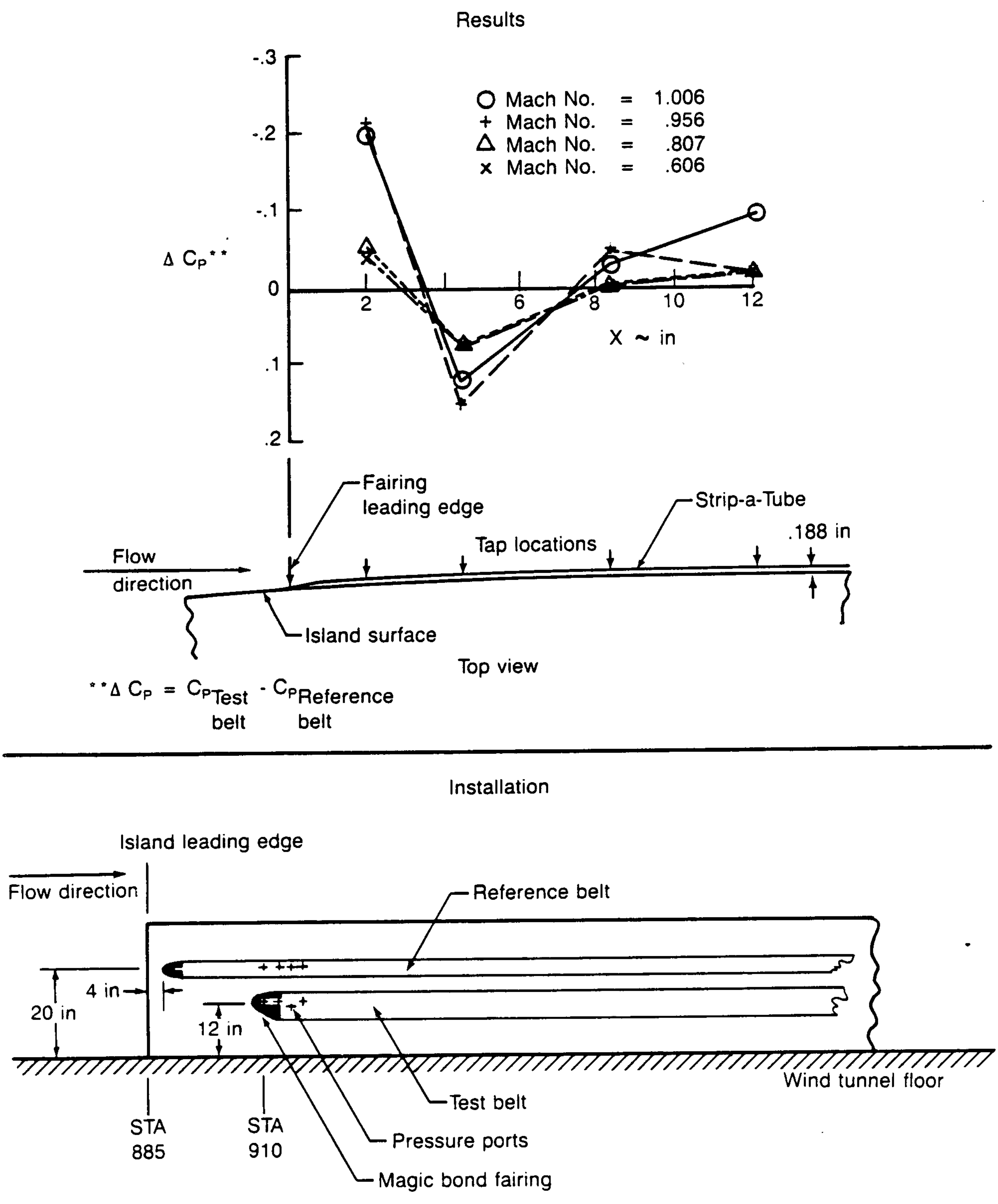


Figure 6-7. Effect of Strip-a-Tube Fairing on Static Pressures

Table 6-1. Flight Test Data Summary, Flight 1

Cond. no.	Mach no.	Altitude, ft	C_L	β, deg	Engine 2 N_1 r/min	Transition location, $\frac{x_{tr}}{c}$ (upper/lower)
0.001	0.822	38 950	0.492	- 0.3	3800	.25/.13
0.002	0.812	39 012	0.501	+ 5.4	3974	.20/.20
0.005	0.807	38 952	0.516	- 0.2	3644	.23/.18
*0.006.1	0.790	39 009	0.537	+ 5.8	3971	.13/.26
0.006.2	0.800	38 926	0.514	- 6.4	3962	.25/.13
0.013	0.801	40 948	0.553	+ 0.2	3934	.23/.18
0.014	0.807	40 946	0.544	0.0	3823	.23/.18
0.015	0.806	40 949	0.543	- 0.2	3733	.23/.18
0.016	0.797	41 002	0.556	+ 6.3	3848	.15/.25
0.017	0.797	40 878	0.552	- 7.1	3986	.25/.13
*0.035	0.807	39 952	0.525	- 0.3	3633	.24/.19
*0.036	0.780	39 956	0.560	- 0.4	3519	.23/.19
0.109	0.787	38 956	0.534	- 0.7	3461	.20/.18

*Data affected by cirrus clouds

Table 6-2. Flight Test Data Summary, Flight 2

Cond. no.	Mach no.	Altitude, ft	C_L	β, deg	Engine 2 N_1 r/min	Transition location, $\frac{x_{tr}}{c}$ (upper/lower)
0.201	0.800	30 011	0.353	- 0.6	3109	.22/.12
0.202	0.793	30 080	0.359	+ 3.3	3114	.23/.18
0.203	0.794	30 075	0.358	- 3.9	3167	.10/.05
0.204	0.805	34 001	0.416	- 0.2	3224	.25/.15
0.205	0.793	34 008	0.427	+ 3.9	3230	.20/.23
0.206	0.801	34 000	0.417	- 3.8	3274	.25/.15
0.207	0.809	36 000	0.450	0.0	3333	.25/.15
0.210	0.801	36 998	0.480	- 0.3	3380	.23/.18
0.211	0.804	37 994	0.498	- 0.2	3538	.23/.18
0.212	0.791	37 988	0.513	+ 3.9	3545	.20/.20
0.213	0.800	37 927	0.500	- 3.7	3485	.23/.15
*0.214	0.805	38 988	0.516	- 0.1	3614	.25/.20
*0.215	0.821	38 988	0.496	- 0.1	3701	.25/.20
0.216	0.832	38 986	0.478	0.0	3972	.25/.13
0.217	0.709	37 007	0.601	- 0.5	3248	.06/.15
0.218	0.701	37 007	0.617	- 0.6	3265	.06/.13
0.219.1	0.636	35 020	0.674	+ 0.7	4123	.03/.12
0.220.1	0.621	35 009	0.705	- 0.8	2683	.03/.10
0.221	0.632	35 007	0.679	- 0.6	2123	.03/.12
0.222	0.805	38 992	0.502	+ 0.1	3571	.23/.18
*0.223	0.804	40 483	0.534	- 0.2	3934	.23/.20
*0.224	0.796	40 482	0.544	- 0.4	3714	.23/.20
*0.225	0.800	40 483	0.537	- 0.7	3437	.23/.18
0.226	0.792	40 426	0.545	+ 4.8	3587	.18/.20
0.227	0.797	40 449	0.537	- 4.0	3615	.25/.18
0.228	0.790	41 295	0.567	- 0.5	2384	.20/.20
0.229	0.754	40 793	0.606	- 0.4	2994	.13/.20
0.231	0.701	39 015	0.641	+ 0.7	4059	.06/.14
0.232	0.697	39 009	0.647	0.0	3618	.06/.15
0.233	0.697	39 005	0.645	- 0.3	3259	.06/.15
0.234	0.699	39 042	0.644	+ 6.8	3412	.08/.27
0.235	0.708	38 954	0.623	- 6.7	3441	.08/.10
0.236	0.705	38 920	0.627	- 0.8	2349	.08/.15
0.237	0.707	39 005	0.623	- 0.5	2962	.08/.15
0.238	0.694	36 497	0.555	- 0.7	1001	.05/.18
0.239	0.802	37 999	0.460	- 0.5	3271	.25/.17
0.240	0.798	38 003	0.464	+ 3.9	3377	.20/.20
0.241	0.802	40 971	0.527	0.0	3653	.23/.18
0.242	0.830	40 968	0.488	+ 0.3	3930	.25/.18
0.243	0.816	38 976	0.457	+ 0.2	3985	.25/.17
0.244	0.821	38 972	0.452	- 0.3	3757	.25/.15
0.245	0.821	38 974	0.450	- 0.3	3542	.25/.15
*0.246	0.816	38 989	0.455	+ 4.0	3988	.25/.23
*0.247	0.813	38 548	0.447	- 0.7	2260	.25/.17
0.248	0.822	38 990	0.480	+ 0.2	3692	.25/.18
0.249	0.784	38 993	0.527	0.0	3392	.20/.20
0.250	0.752	38 999	0.573	+ 0.1	3382	.10/.20
0.251	0.757	38 997	0.563	+ 0.2	4023	.10/.20
0.252	0.753	38 994	0.569	- 0.4	3638	.10/.20

*Data affected by cirrus clouds

Table 6-3. Flight Test Data Summary, Flight 3

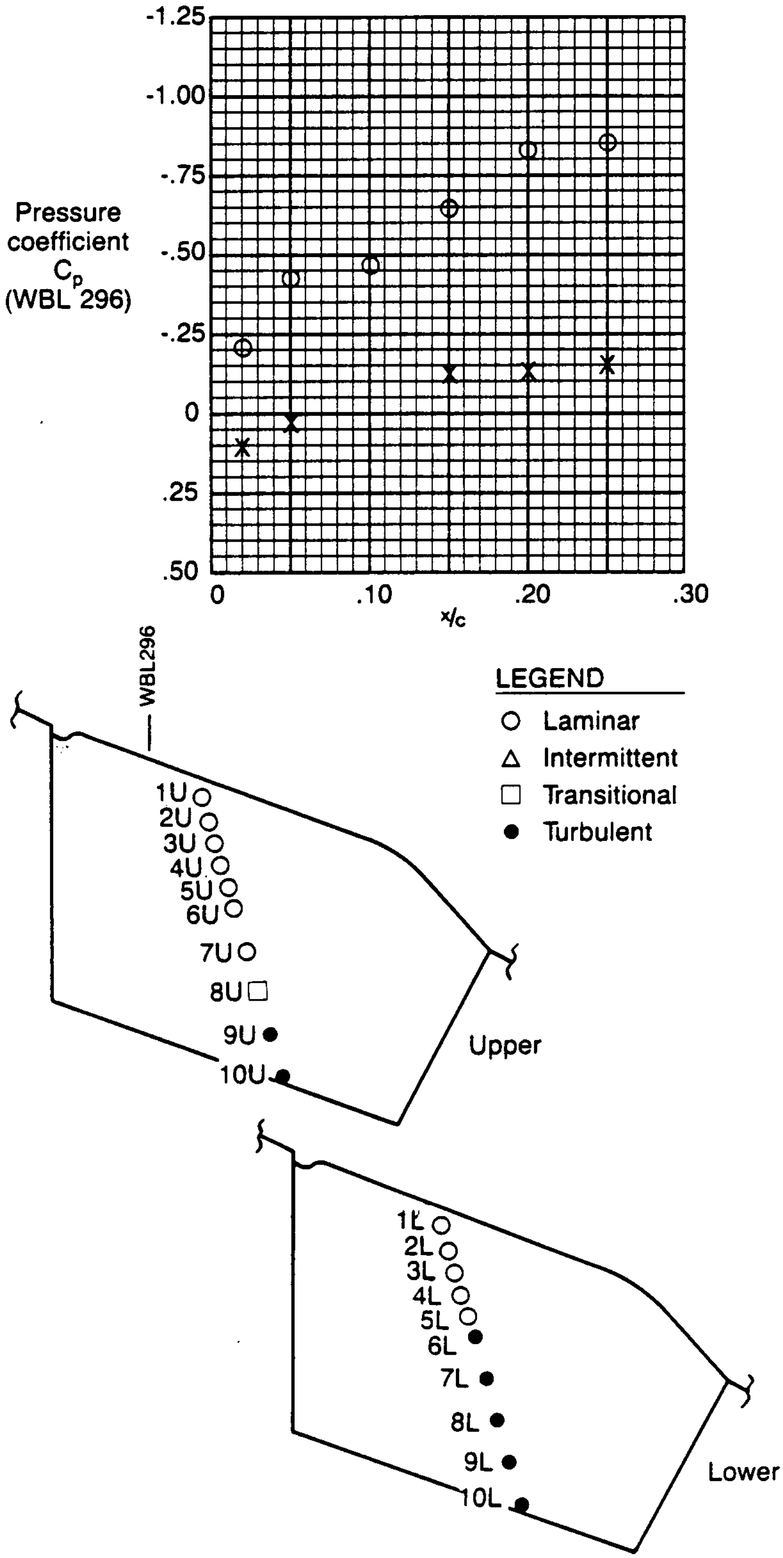
Cond. no.	Mach no.	Altitude, ft	C_L	β, deg	Engine 2 N_1 r/min	Transition location, $\frac{x_{tr}}{c}$ (upper/lower)		
						Inboard	Midspan	Outboard
0.001	0.703	30 009	0.442	+0.5	3468	–/–**	–/.15	–/.15
0.002	0.701	30 005	0.445	+5.3	3535	–/.20	–/.20	–/.20
0.003	0.801	30 728	0.350	0.0	3602	–/–	.20/–	–/.15
0.004	0.798	30 721	0.352	+3.5	3606	.25/.18	.23/.18	–/.15
0.005	0.799	30 682	0.350	–3.4	3677	–/–	.20/–	–/–
0.006	0.807	34 669	0.410	0.0	3677	.25/–	.25/.15	–/.15
0.006.1	0.800	35 062	0.422	+0.2	3619	.25/–	.23/.15	–/.15
0.007	0.820	34 668	0.398	0.0	3746	–/–	.25/.15	–/–
0.007.1	0.817	35 065	0.405	+0.1	3691	—	.25/.15	–/–
0.008	0.780	35 067	0.444	+0.2	3585	.25/–	.20/.17	–/.15
0.009	0.753	35 075	0.476	+0.3	3558	.20/–	–/.17	–/.15
0.010	0.704	35 080	0.543	+0.3	3477	–/–	–/.15	–/.15
0.011	0.698	35 080	0.553	+6.7	3628	–/.25	–/.25	–/.23
0.012	0.799	36 588	0.451	+0.1	3631	.23/–	.23/.15	–/.15
0.013	0.801	38 035	0.479	+0.1	3649	.28/–	.23/.18	–/.15
0.014	0.823	39 863	0.492	+0.1	3919	.28/–	.23/–	–/.15
0.015	0.834	39 862	0.480	+0.1	3945	.28/–	.25/.15	–/.15
0.016	0.802	40 480	0.530	+0.4	3964	.28/.17	.23/.18	–/.15
0.017	0.802	40 419	0.529	+0.1	3795	.28/.17	.23/.18	–/.15
0.018	0.805	40 477	0.525	0.0	3653	.28/.17	.23/.18	–/.15
0.019	0.797	40 544	0.537	+4.0	3661	.25/.23	.20/.25	–/.20
0.020	0.792	40 443	0.540	-4.1	3661	.27/–	.23/.15	–/.15
0.021	0.703	39 137	0.640	+0.9	4056	–/–	–/.15	–/.15
0.022	0.700	39 128	0.647	+0.4	3667	–/–	–/.15	–/.15
0.023	0.695	39 190	0.655	–0.4	3068	–/–	–/.15	–/.15
0.024	0.692	39 180	0.660	+7.0	3502	–/.25	–/.25	–/.23
0.025	0.719	39 075	0.608	–7.8	4037	.15/–	–/–	–/–
0.026	0.801	39 092	0.494	+0.2	3708	.28/.17	.23/.18	–/.15
0.027	0.821	38 440	0.451	+0.1	3754	.27/–	.25/.18	–/.15
0.028	0.778	39 646	0.531	+0.2	3681	.25/.15	–/.20	–/.17
0.029	0.752	39 661	0.567	+0.2	3638	.18/.15	–/.20	–/.18
0.030	0.825	40 761	0.495	0.0	3953	.29/–	.25/.18	–/.15
0.031	0.706	35 180	0.513	+1.2	4084	–/–	–/.17	–/.15
0.032	0.704	35 213	0.515	–0.5	2537	–/–	–/.15	–/.15
0.033	0.706	35 154	0.513	+0.1	3528	–/–	–/.18	–/.15
0.034	0.800	35 325	0.400	–0.1	3568	.23/–	.25/.15	–/–
0.035	0.800	25 005	0.248	–0.6	3570	–/–	–/–	–/–
0.036	0.794	24 979	0.251	+2.6	3569	–/–	–/–	–/–
0.037	0.798	38 015	0.462	+0.1	3649	.28/.17	.23/.18	–/.15
0.038	0.698	35 215	0.525	–0.7	2099	–/–	–/.17	–/.15

**Indicates transition ahead of $\frac{x}{c} = .15$

Table 6-4. Flight Test Data Summary, Flight 4

Cond. no.	Mach no.	Altitude, ft	C_L	β, deg	Engine 2 N_1 r/min	Transition location, $\frac{x_{tr}}{c}$ (upper/lower)		
						Inboard	Midspan	Outboard
0.001	0.700	30 001	0.448	0.0	3412	–/–**	–/.15	–/–
0.002	0.708	29 897	0.436	+5.2	3539	–/.20	–/.20	–/.20
0.003	0.800	30 517	0.350	−0.3	3586	–/–	.25/–	–/–
0.004	0.797	30 585	0.354	+3.6	3736	–/.19	.22/.18	–.15
0.005	0.805	30 590	0.346	−3.5	3688	–/–	–/–	–/–
0.006	0.799	34 447	0.419	−0.2	3640	.15/–	.23/.15	–/–
0.007	0.820	34 448	0.398	−0.2	3680	–/–	.23/.15	–/–
0.008	0.780	34 449	0.439	−0.1	3595	.15/–	.23/.15	–/.15
0.009	0.752	34 453	0.472	−0.1	3555	–/–	–/.15	–/.15
0.010	0.701	34 471	0.542	−0.1	3510	–/–	–/–	–/.15
0.011	0.701	34 451	0.541	+6.4	3699	–/.20	–/.25	–/.20
0.012	0.800	36 176	0.450	−0.1	3654	.15/–	.23/.15	–/.15
0.013	0.801	37 563	0.478	−0.1	3679	.15/–	.23/–	–/.15
0.014	0.819	39 460	0.498	−0.1	3861	.15/–	.23/–	–/.15
0.015	0.829	39 459	0.484	−0.2	3953	.15/–	.23/.15	–/.15
0.016	0.800	39 960	0.531	−0.2	3962	.15/.15	.23/.18	–/.15
0.017	0.800	39 961	0.531	+0.1	3768	.15/.15	.23/.18	–/.15
0.018	0.800	40 065	0.532	+0.4	3690	.15/.15	.23/.18	–/.15
0.019	0.802	40 091	0.531	+3.6	3840	–/.20	.23/.20	–/.17
0.020	0.800	40 086	0.532	−3.7	3898	.17/–	.23/.15	–/.15
0.021	0.700	38 592	0.644	−0.3	4048	–/–	–/–	–/.15
0.022	0.701	38 668	0.644	+0.2	3679	–/–	–/–	–/.15
0.023	0.699	38 670	0.647	+0.3	3332	–/–	–/–	–/.15
0.024	0.700	38 615	0.643	+6.4	3339	–/.20	–/.25	–/.20
0.025	0.700	38 790	0.647	−6.0	3961	–/–	–/–	–/–
0.026	0.798	38 806	0.497	+0.2	3737	.15/.15	.23/.18	–/.15
0.027	0.824	37 973	0.447	0.0	3782	.15/–	.23.15	–/.15
0.028	0.777	39 167	0.531	+0.1	3715	.15/.15	.20/.20	–/.17
0.029	0.752	39 176	0.567	+0.1	3707	–/–	–/.18	–/.16
0.030	0.827	40 353	0.493	−0.1	3995	.15/–	.23/.18	–/.15
0.031	0.700	34 694	0.522	−0.3	4078	–/–	–/.15	–/.15
0.032	0.703	34 697	0.517	+0.5	2669	–/–	–/.18	–/.17
0.033	0.703	34 692	0.518	−0.1	3501	–/–	–/.15	–/.15
0.034	0.802	34 776	0.397	−0.3	3581	–/–	.23/.15	–/.15
0.037	0.802	37 569	0.457	−0.2	3648	.15/–	.23/.17	–/.15
0.039	0.702	33 024	0.478	+5.0	4061	–/.20	–/.22	–/.22
0.040	0.711	32 961	0.463	+4.8	2406	–/.23	–/.25	–/.22

**Indicates transition ahead of $\frac{x}{c} = .15$



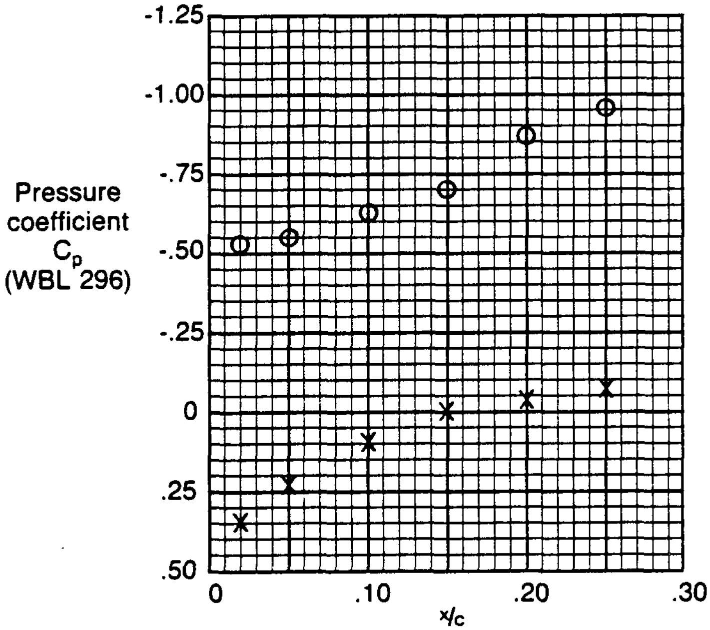
Mach No. = .822
Altitude = 38 950 ft
C_L = .492
β = -0.3 deg
α_B = 2.46 deg
$N_{1_{E2}}$ = 3800 r/min

NOTES:
Pressures adjusted by Δ Cp = +.207

Hot film no.	$\frac{x}{c}$	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	198	196	199	1
2U	.050	6	5	6	1
3U	.075	8	7	9	1
4U	.100	6	6	6	0
5U	.125	5	4	7	1
6U	.15	4	4	5	0
7U	.20	9	9	10	0
8U	.25	290	113	404	62
9U	.30	35	29	44	3
10U	.35	20	16	25	2
Lower					
1L	.020	4	3	5	1
2L	.050	7	6	9	0
3L	.075	9	7	12	1
4L	.100	11	10	14	1
5L	.125	15	12	19	1
6L	.15	23	16	66	6
7L	.20	19	17	24	1
8L	.25	34	28	45	2
9L	.30	59	45	81	6
10L	.35	71	56	99	6

* Out of order

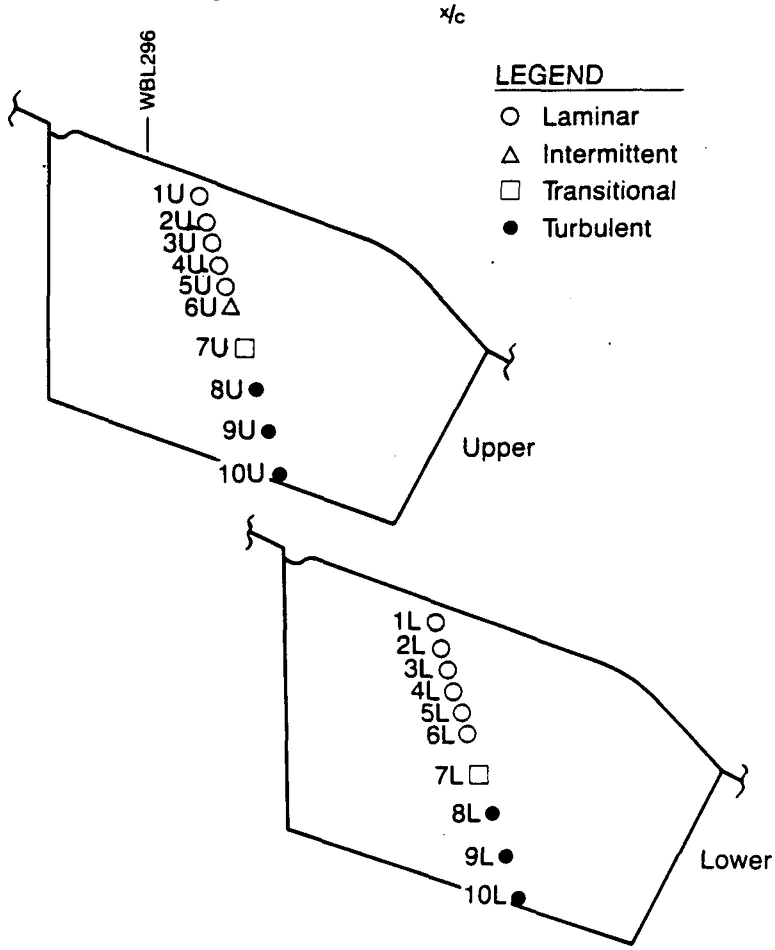
Figure 6-8. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.001



Mach No. = .812
Altitude = 39 012 ft
C_L = .501
β = +5.4 deg
α_B = 2.94 deg
$N_{1_{E2}}$ = 3974 r/min

NOTES:

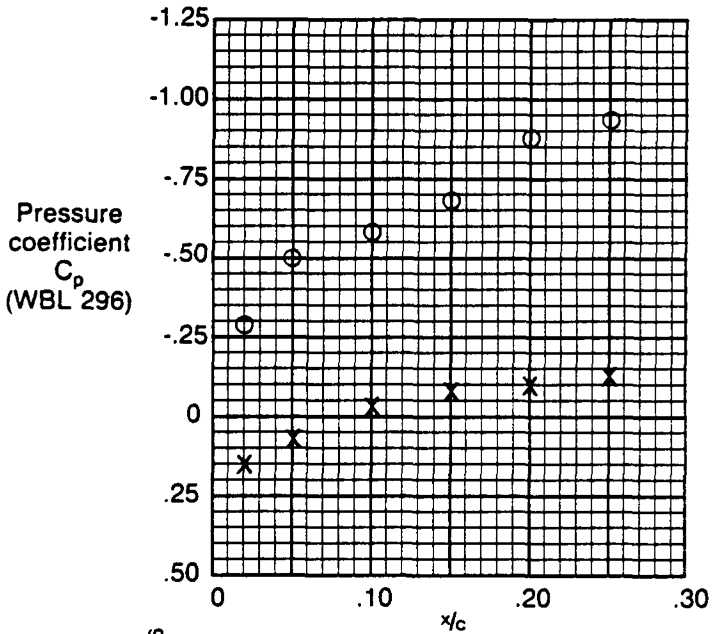
Pressures adjusted by Δ Cp = +.232



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	199	196	202	1
2U	.050	6	5	7	0
3U	.075	8	7	9	1
4U	.100	6	6	6	0
5U	.125	8	4	48	6
6U	.15	24	4	322	43
7U	.20	223	11	534	155
8U	.25	42	35	50	3
9U	.30	40	32	54	3
10U	.35	19	15	22	1
Lower					
1L	.020	3	3	4	0
2L	.050	7	6	7	0
3L	.075	6	5	7	1
4L	.100	9	7	11	1
5L	.125	12	10	14	1
6L	.15	15	12	19	1
7L	.20	51	10	168	32
8L	.25	31	26	46	3
9L	.30	52	40	69	5
10L	.35	63	48	89	6

* Out of order

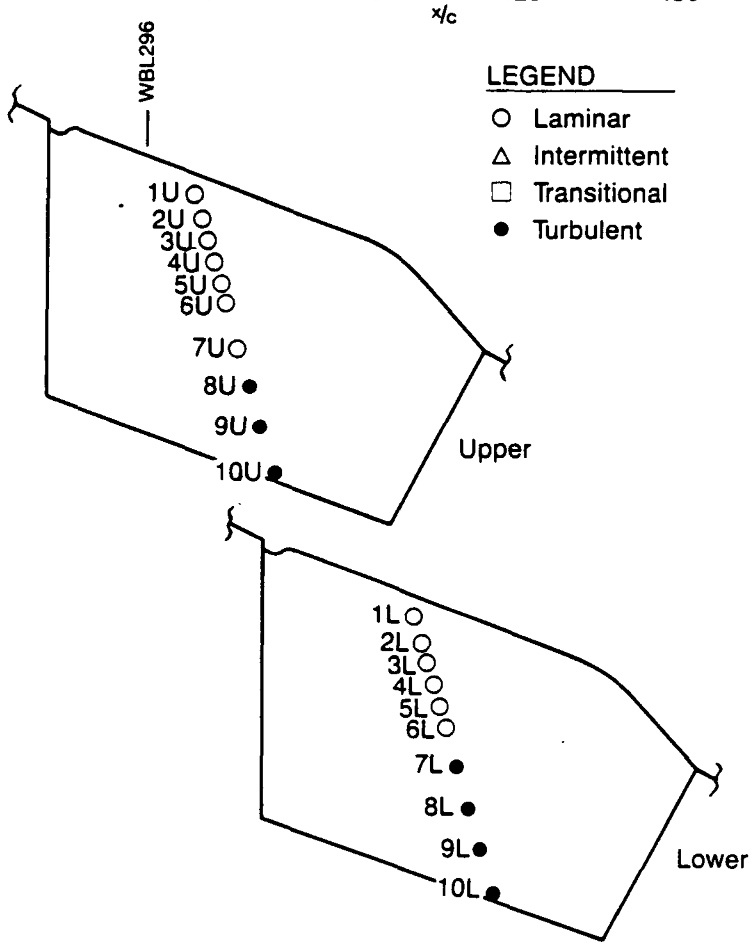
Figure 6-9. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.002



Mach No.	=	.807
Altitude	=	38 952 ft
C_L	=	.516
β	=	-0.2 deg
α_B	=	2.76 deg
$N_{1_{E2}}$	=	3644 r/min

NOTES:

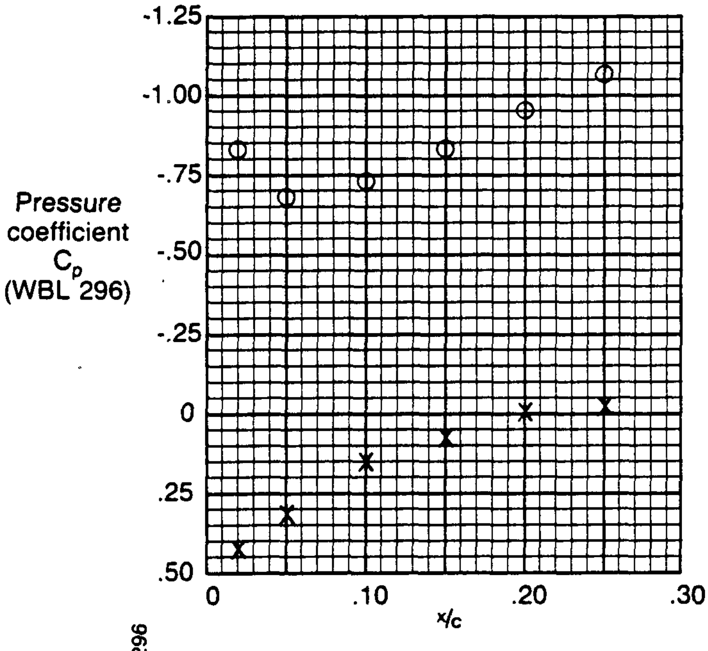
Pressures adjusted by Δ Cp = +.269



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	190	188	193	2
2U	.050	6	5	7	1
3U	.075	8	7	9	1
4U	.100	6	6	6	0
5U	.125	6	4	9	1
6U	.15	6	5	8	1
7U	.20	9	9	10	0
8U	.25	38	32	48	3
9U	.30	40	32	53	3
10U	.35	22	17	28	2
Lower					
1L	.020	4	3	5	1
2L	.050	7	6	7	1
3L	.075	7	6	8	1
4L	.100	10	8	11	0
5L	.125	12	10	16	1
6L	.15	16	13	20	1
7L	.20	21	17	27	2
8L	.25	34	27	45	3
9L	.30	61	47	82	6
10L	.35	71	53	95	7

* Out of order

Figure 6-10. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.005

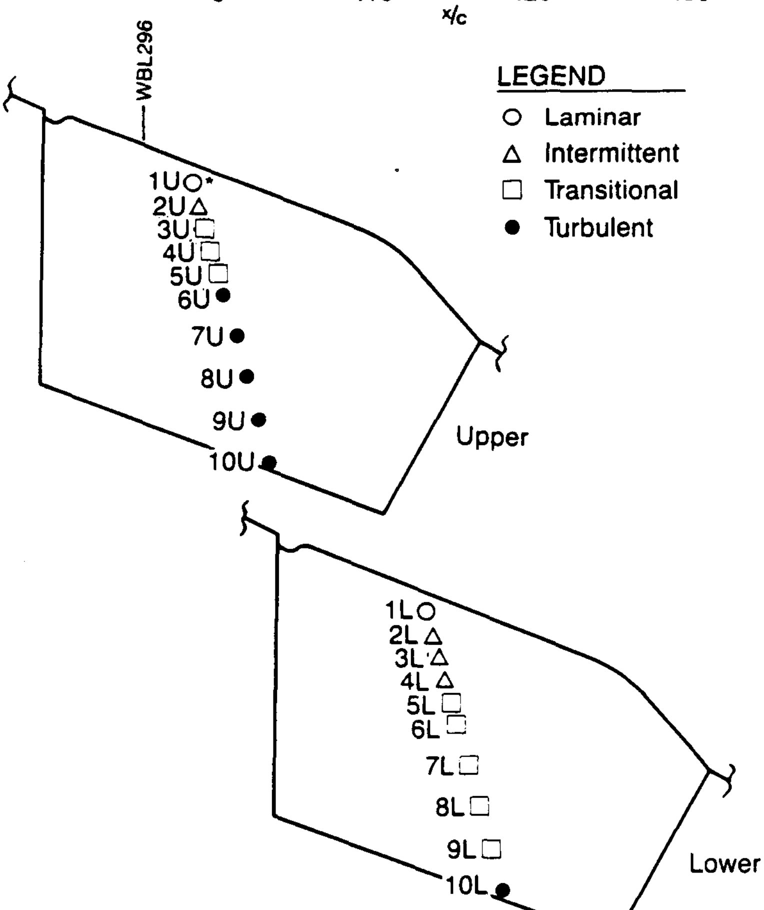


Mach No. = .790
Altitude = 39 009 ft
C_L = .537
β = +5.8 deg
α_B = 3.40 deg
$N_{1_{E2}}$ = 3971 r/min

NOTES:

Pressures adjusted by Δ Cp = +.283

Data affected by cirrus clouds

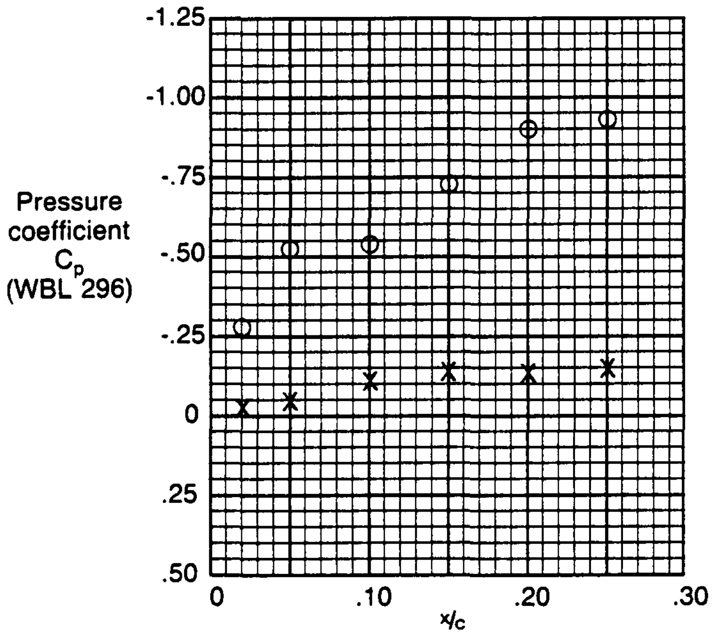


* Hot film at x/c = .02 out of order

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	194	191	198	2
2U	.050	82	5	361	82
3U	.075	189	7	503	151
4U	.100	475	89	628	93
5U	.125	174	37	604	105
6U	.15	60	34	349	32
7U	.20	53	42	113	6
8U	.25	52	43	67	4
9U	.30	47	37	59	4
10U	.35	21	18	27	2
Lower					
1L	.020	12	2	81	16
2L	.050	68	6	268	64
3L	.075	172	5	495	147
4L	.100	218	7	481	155
5L	.125	287	9	505	169
6L	.15	379	12	658	188
7L	.20	144	10	270	76
8L	.25	155	38	413	96
9L	.30	82	45	346	32
10L	.35	73	53	103	9

* Out of order

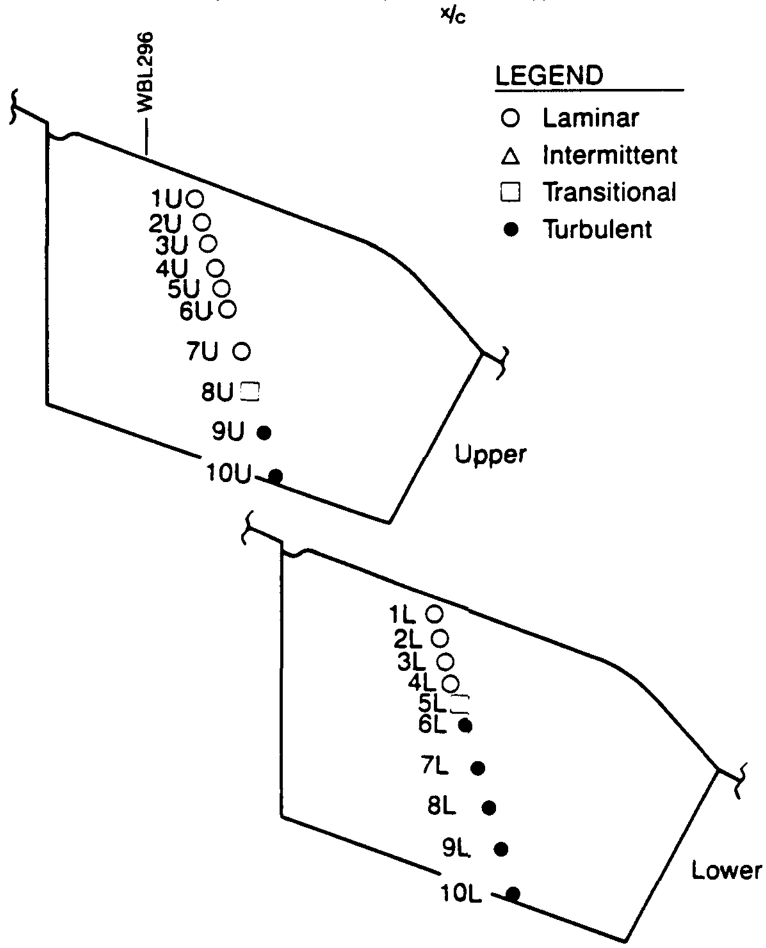
Figure 6-11. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.006.1



Mach No. = .800
Altitude = 38 926 ft
C_L = .514
β = -6.4 deg
α_B = 3.93 deg
$N_{1_{E2}}$ = 3962 r/min

NOTES:

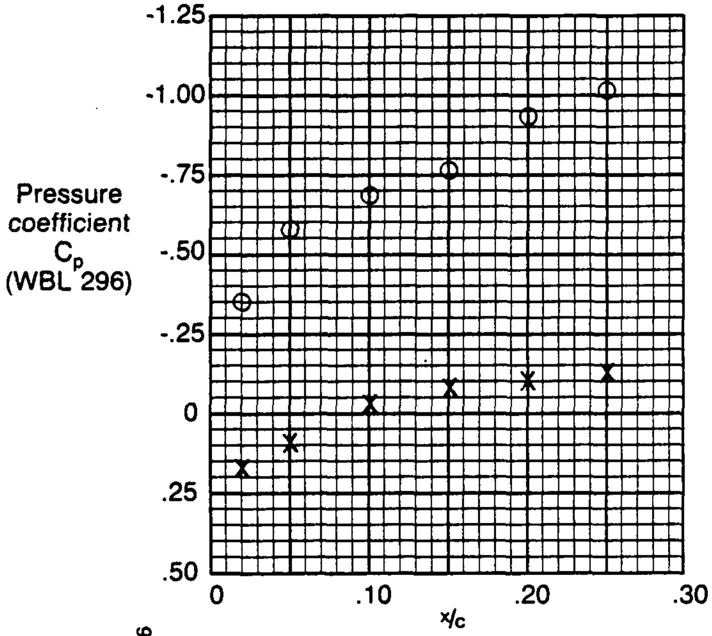
Pressures adjusted by Δ Cp = +.163



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	200	198	204	1
2U	.050	6	5	9	1
3U	.075	8	7	10	1
4U	.100	6	6	10	1
5U	.125	7	4	10	1
6U	.15	6	4	10	1
7U	.20	10	9	10	1
8U	.25	79	37	242	35
9U	.30	38	31	47	3
10U	.35	20	17	32	2
Lower					
1L	.020	8	5	14	2
2L	.050	9	9	11	1
3L	.075	15	11	32	2
4L	.100	15	12	73	4
5L	.125	314	58	445	61
6L	.15	38	32	51	3
7L	.20	21	18	26	1
8L	.25	37	29	47	3
9L	.30	64	48	82	6
10L	.35	71	54	102	7

* Out of order

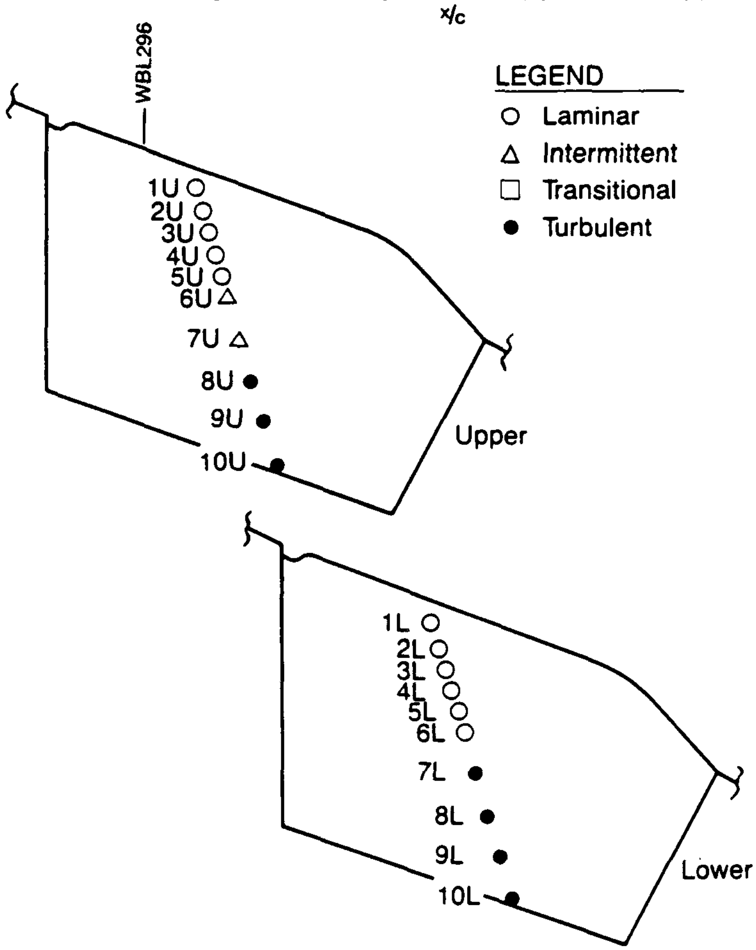
Figure 6-12. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.006.2



Mach No. = .801
Altitude = 40 948 ft
C_L = .553
β = +0.2 deg
α_B = 3.02 deg
$N_{1_{E2}}$ = 3934 r/min

NOTES:

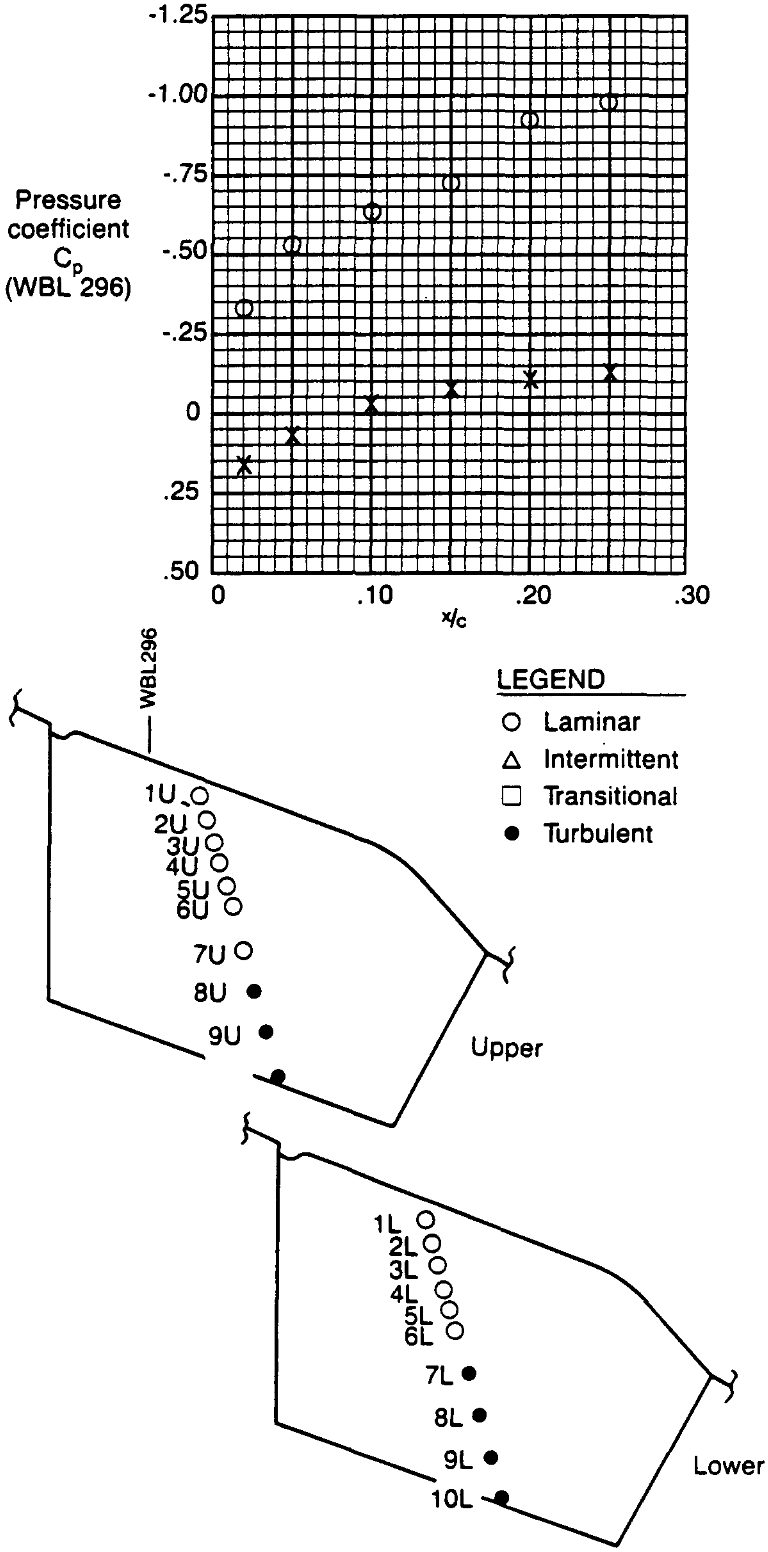
Pressures adjusted by Δ Cp = +.337



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U*	.020	212	211	212	1
2U	.050	6	5	6	0
3U	.075	8	7	9	1
4U	.100	6	5	61	4
5U	.125	10	4	295	30
6U	.15	17	4	312	46
7U	.20	43	9	377	67
8U	.25	42	32	284	23
9U	.30	38	31	48	3
10U	.35	19	16	23	1
		Lower			
1L	.020	3	3	4	1
2L	.050	6	2	16	3
3L	.075	8	6	208	15
4L	.100	11	8	202	17
5L	.125	15	10	212	20
6L	.15	18	12	285	26
7L	.20	21	16	48	3
8L	.25	32	27	39	2
9L	.30	57	46	75	6
10L	.35	65	52	81	6

* Out of order

Figure 6-13. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.013



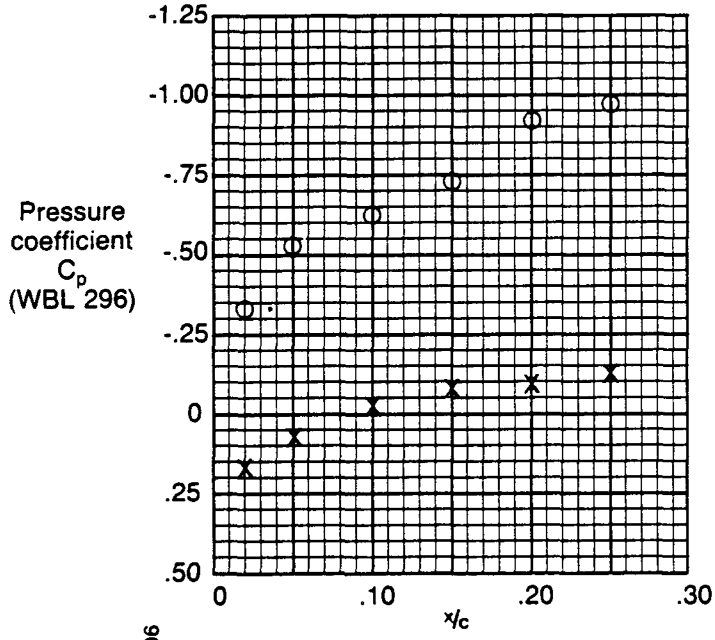
Mach No. = .807
Altitude = 40 946 ft
C_L = .544
β = 0.0 deg
α_B = 2.89 deg
$N_{1_{E2}}$ = 3823 r/min

NOTES:
Pressures adjusted by Δ Cp = +.341

Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U*	.020	208	205	211	2
2U	.050	6	5	9	0
3U	.075	8	7	9	1
4U	.100	6	5	7	0
5U	.125	6	4	8	1
6U	.15	5	4	11	1
7U	.20	10	9	16	1
8U	.25	35	29	60	3
9U	.30	37	29	45	3
10U	.35	19	15	22	1
		Lower			
1L	.020	4	3	8	1
2L	.050	6	3	17	3
3L	.075	7	5	8	1
4L	.100	9	7	10	1
5L	.125	11	10	14	1
6L	.15	15	12	61	3
7L	.20	19	16	27	2
8L	.25	31	27	38	2
9L	.30	56	44	75	6
10L	.35	64	50	82	6

* Out of order

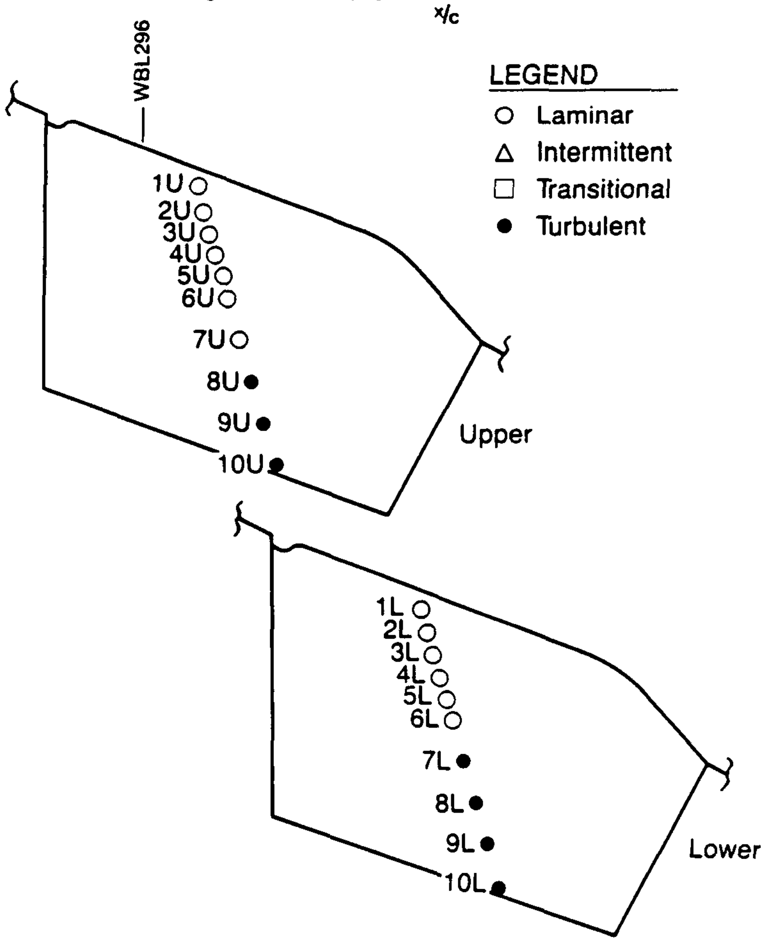
Figure 6-14. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.014



Mach No. = .806
Altitude = 40 949 ft
C_L = .543
β = -0.2 deg
α_B = 2.86 deg
$N_{1_{E2}}$ = 3733 r/min

NOTES:

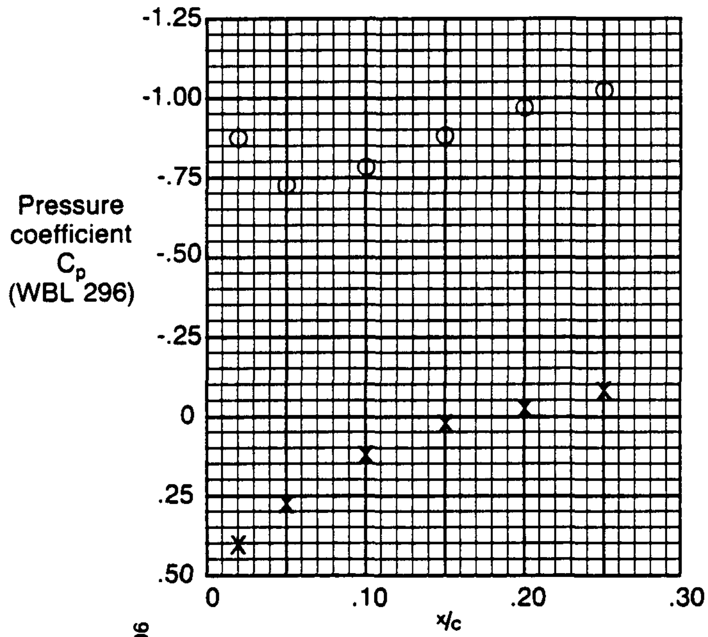
Pressures adjusted by Δ Cp = +.341



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U*	.020	207	205	210	2
2U	.050	6	5	6	0
3U	.075	8	7	9	1
4U	.100	6	5	6	0
5U	.125	5	4	7	1
6U	.15	5	4	6	0
7U	.20	10	9	10	1
8U	.25	35	29	42	2
9U	.30	37	31	48	3
10U	.35	18	16	23	1
Lower					
1L	.020	3	3	5	1
2L	.050	6	3	15	2
3L	.075	6	5	7	0
4L	.100	8	7	10	0
5L	.125	11	9	12	1
6L	.15	14	12	16	1
7L	.20	19	16	27	2
8L	.25	31	27	38	2
9L	.30	56	44	69	5
10L	.35	64	51	79	6

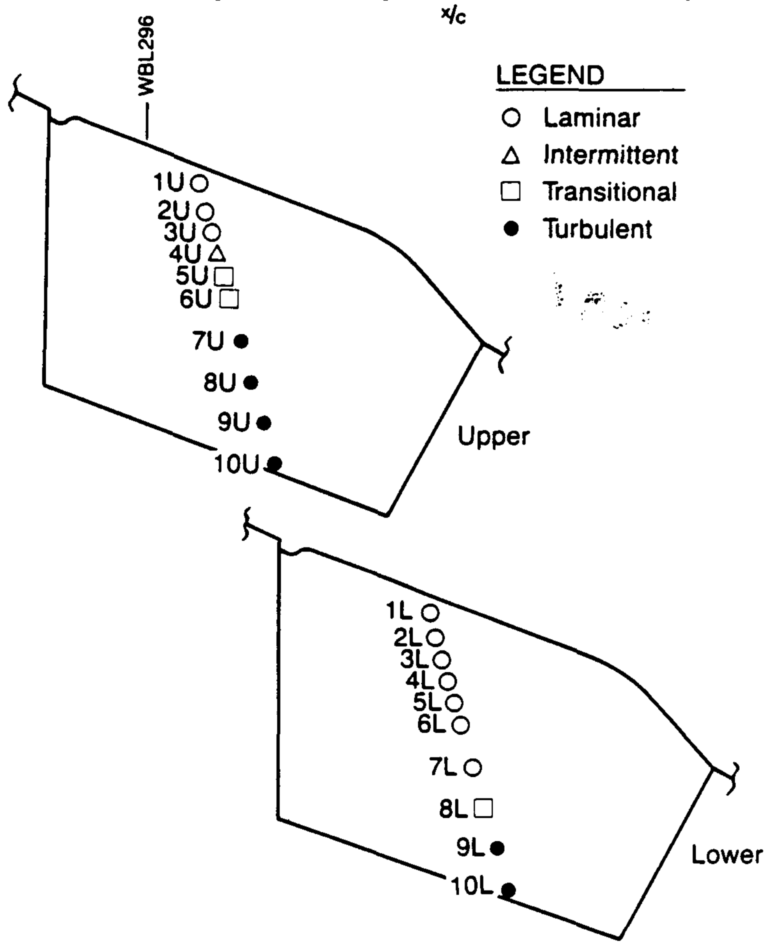
* Out of order

Figure 6-15. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.015



Mach No. = .797
Altitude = 41 002 ft
C_L = .556
β = +6.3 deg
α_B = 3.71 deg
$N_{1_{E2}}$ = 3848 r/min

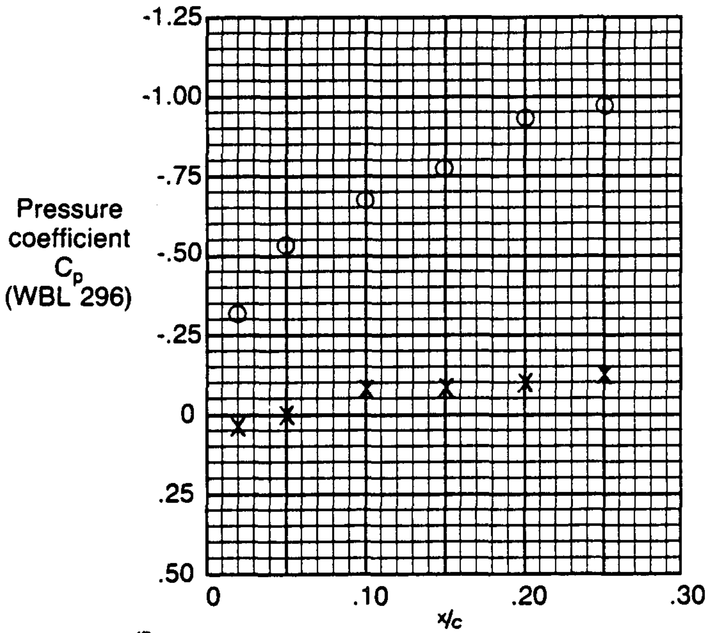
NOTES:
Pressures adjusted by Δ Cp = +.341



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U*	.020	210	206	211	1
2U	.050	6	5	7	0
3U	.075	8	7	9	1
4U	.100	32	6	239	46
5U	.125	241	24	530	139
6U	.15	155	36	498	140
7U	.20	45	37	99	6
8U	.25	47	40	56	3
9U	.30	42	32	55	4
10U	.35	19	16	25	2
Lower					
1L	.020	2	2	3	1
2L	.050	6	2	14	2
3L	.075	5	4	5	1
4L	.100	7	6	8	0
5L	.125	9	8	10	1
6L	.15	11	10	12	1
7L	.20	8	7	9	0
8L	.25	240	63	380	64
9L	.30	50	38	67	5
10L	.35	57	46	70	5

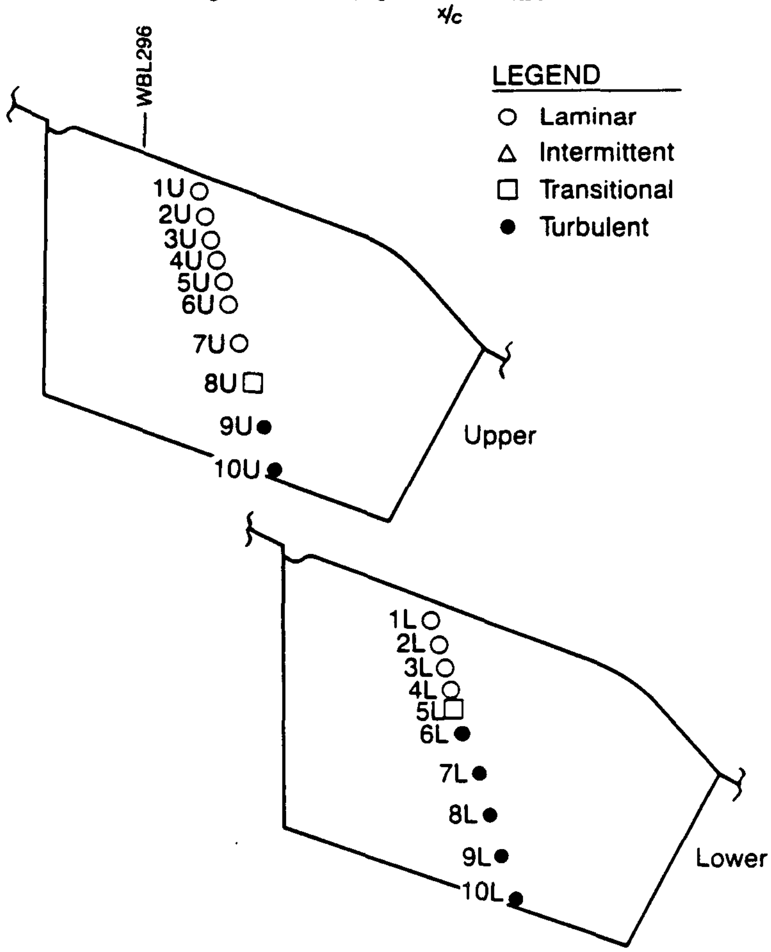
* Out of order

Figure 6-16. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.016



Mach No. = .797
Altitude = 40 878 ft
C_L = .552
β = -7.1 deg
α_B = 3.91 deg
$N_{1_{E2}}$ = 3986 r/min

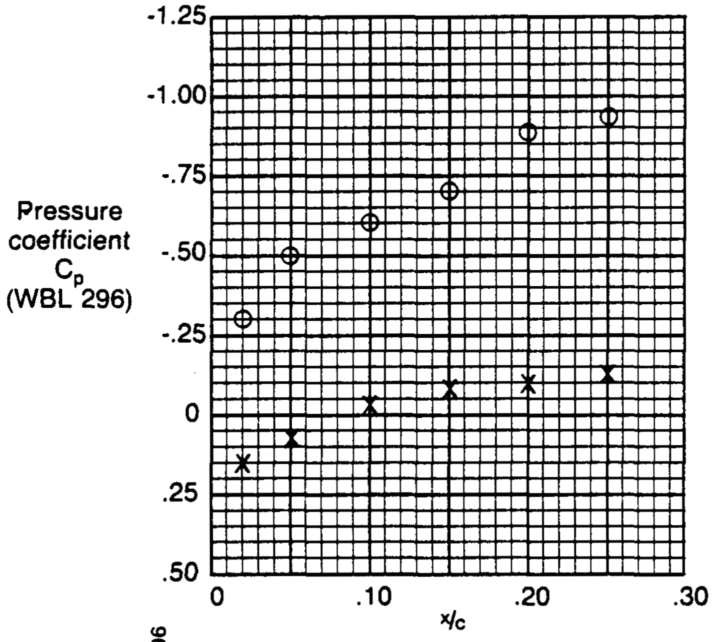
NOTES:
Pressures adjusted by Δ Cp = +.338



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U*	.020	210	208	212	1
2U	.050	6	6	9	1
3U	.075	8	7	14	1
4U	.100	6	6	9	0
5U	.125	6	4	9	1
6U	.15	6	4	13	2
7U	.20	10	9	11	0
8U	.25	158	35	308	70
9U	.30	35	29	49	3
10U	.35	19	15	35	3
Lower					
1L	.020	7	5	11	1
2L	.050	8	3	25	4
3L	.075	12	9	16	1
4L	.100	14	11	94	7
5L	.125	278	32	424	100
6L	.15	38	32	75	5
7L	.20	19	16	24	1
8L	.25	34	28	41	2
9L	.30	58	45	81	6
10L	.35	66	52	86	6

* Out of order

Figure 6-17. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.017

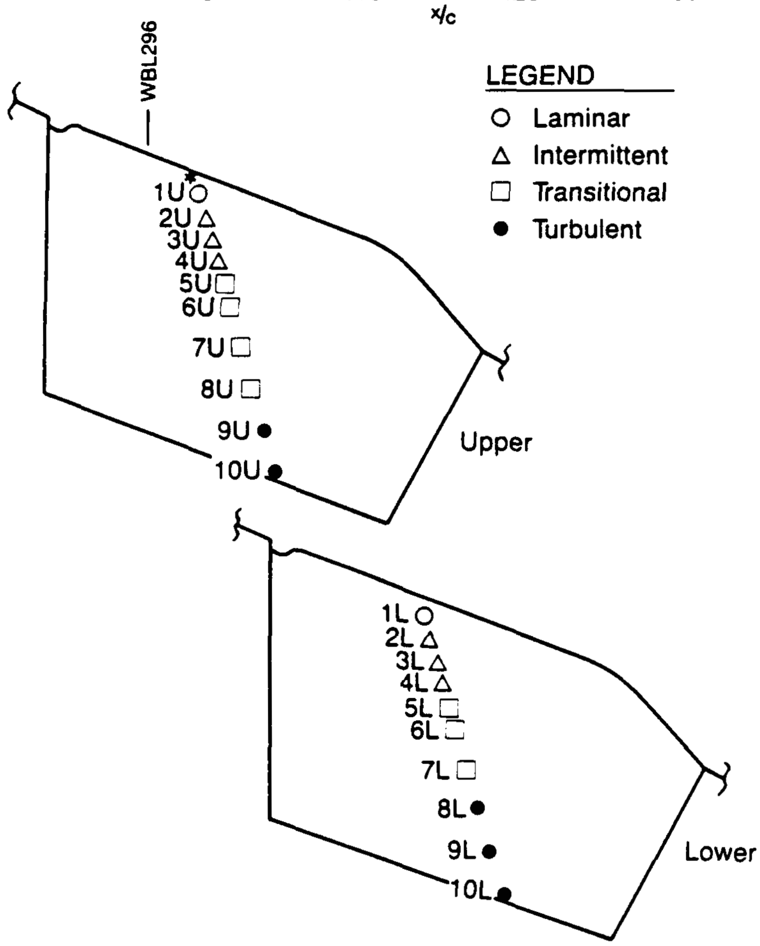


Mach No. = .807
Altitude = 39 952 ft
C_L = .525
β = -0.3 deg
α_B = 2.82 deg
$N_{1_{E2}}$ = 3633 r/min

NOTES:

Pressures adjusted by Δ Cp = +.285

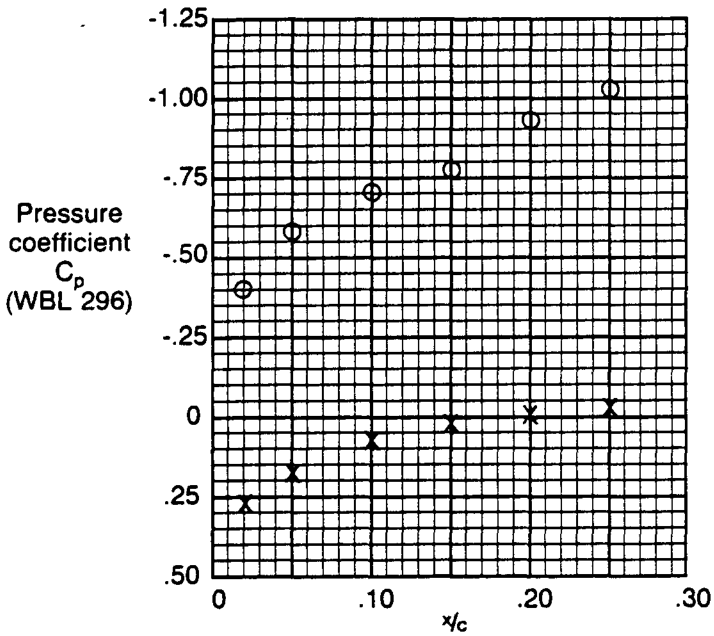
Data affected by cirrus clouds



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U*	.020	207	206	208	1
2U	.050	39	5	174	35
3U	.075	76	7	283	64
4U	.100	141	6	399	99
5U	.125	212	7	510	126
6U	.15	225	8	468	115
7U	.20	322	21	493	108
8U	.25	162	51	360	79
9U	.30	46	36	66	5
10U	.35	21	17	26	2
		Lower			
1L	.020	10	3	81	14
2L	.050	23	3	424	57
3L	.075	137	7	425	95
4L	.100	195	11	417	96
5L	.125	279	16	464	104
6L	.15	471	158	645	112
7L	.20	113	28	226	43
8L	.25	54	32	145	19
9L	.30	69	49	101	9
10L	.35	70	55	90	6

* Out of order

Figure 6-18. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.035

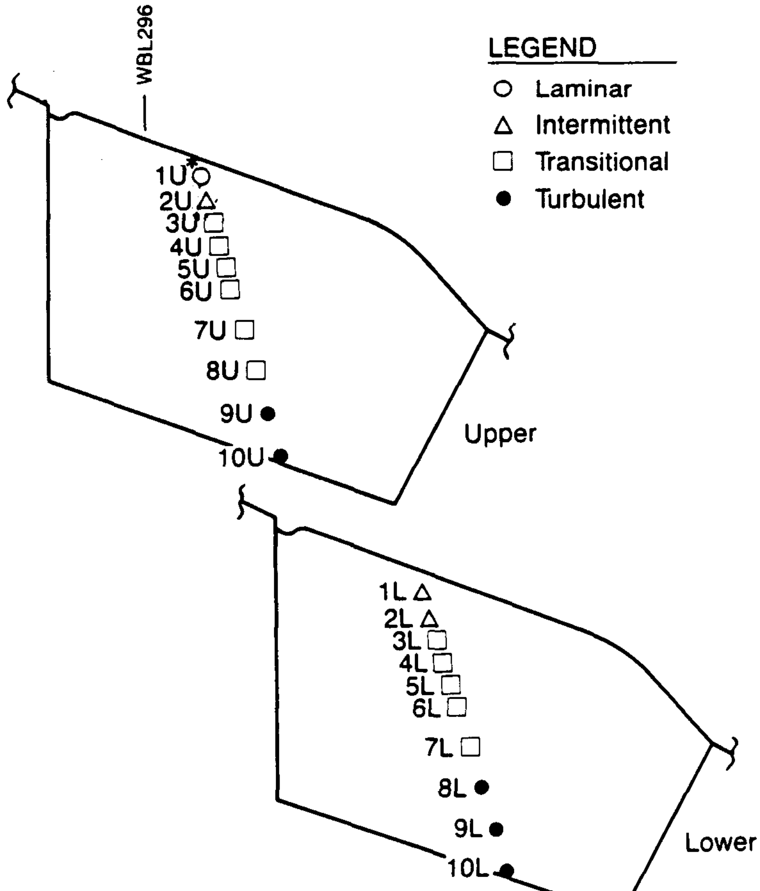


Mach No. = .780
Altitude = 39 956 ft
C_L = .560
β = -0.4 deg
α_B = 3.32 deg
$N_{1_{E2}}$ = 3519 r/min

NOTES:

Pressures adjusted by Δ Cp = +.330

Data affected by cirrus clouds



* Hot film at x/c = .02 out of order

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	209	208	209	0
2U	.050	110	6	354	83
3U	.075	238	18	509	132
4U	.100	377	61	599	139
5U	.125	441	93	647	121
6U	.15	369	46	629	199
7U	.20	280	46	574	187
8U	.25	70	44	234	30
9U	.30	47	36	58	4
10U	.35	21	17	26	2
Lower					
1L	.020	28	2	141	30
2L	.050	76	2	630	108
3L	.075	280	12	490	132
4L	.100	296	59	445	86
5L	.125	333	60	493	105
6L	.15	391	52	667	202
7L	.20	77	20	214	54
8L	.25	50	35	176	18
9L	.30	69	51	99	8
10L	.35	74	59	98	7

* Out of order

Figure 6-19. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.036

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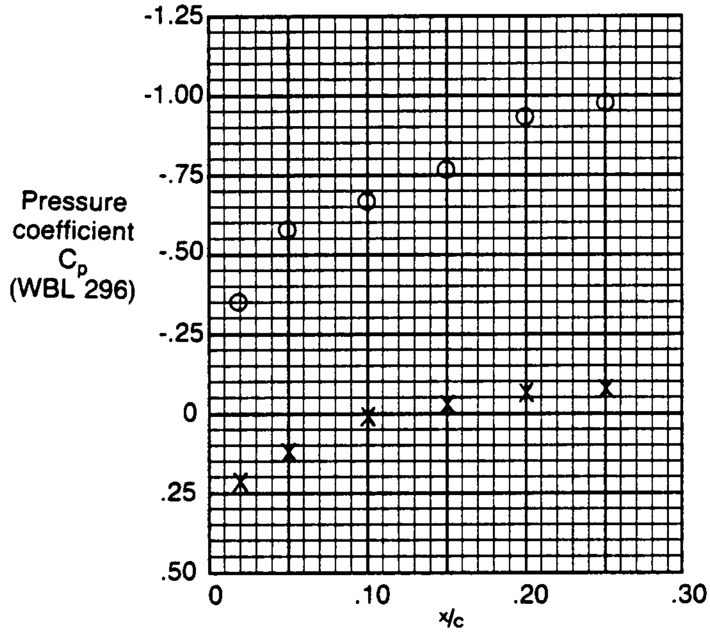
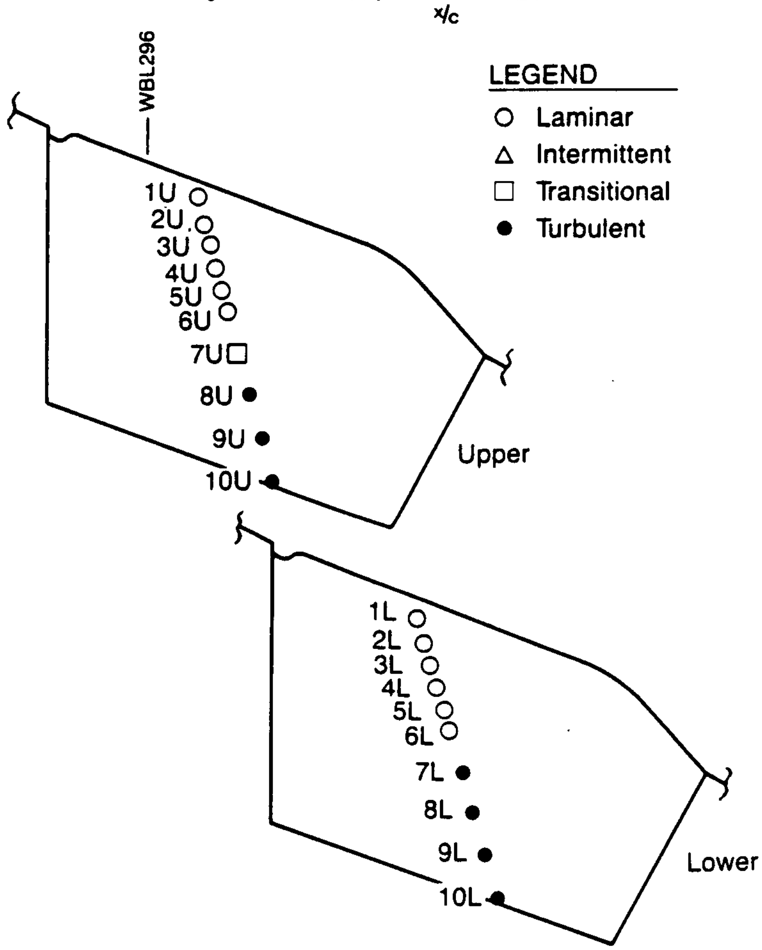


Mach No.	=	.787
Altitude	=	38 956 ft
C_L	=	.534
β	=	-0.7 deg
α_B	=	3.03 deg
$N_{1_{E2}}$	=	3461 r/min

NOTES:

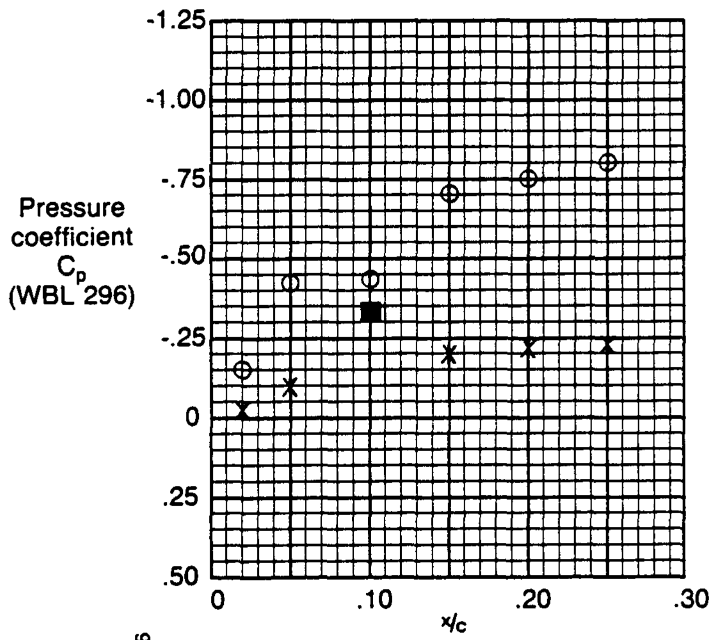
Pressures adjusted by Δ Cp = +.221



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U*	.020	199	198	202	1
2U	.050	5	5	6	1
3U	.075	8	7	9	1
4U	.100	6	5	6	0
5U	.125	5	4	8	1
6U	.15	5	4	8	1
7U	.20	216	17	538	142
8U	.25	41	35	49	3
9U	.30	43	34	53	3
10U	.35	21	18	28	2
Lower					
1L	.020	3	2	3	0
2L	.050	6	6	6	0
3L	.075	5	5	6	1
4L	.100	8	7	10	0
5L	.125	10	8	12	1
6L	.15	13	11	16	1
7L	.20	20	17	36	2
8L	.25	32	27	42	2
9L	.30	59	47	78	6
10L	.35	68	53	90	6

* Out of order

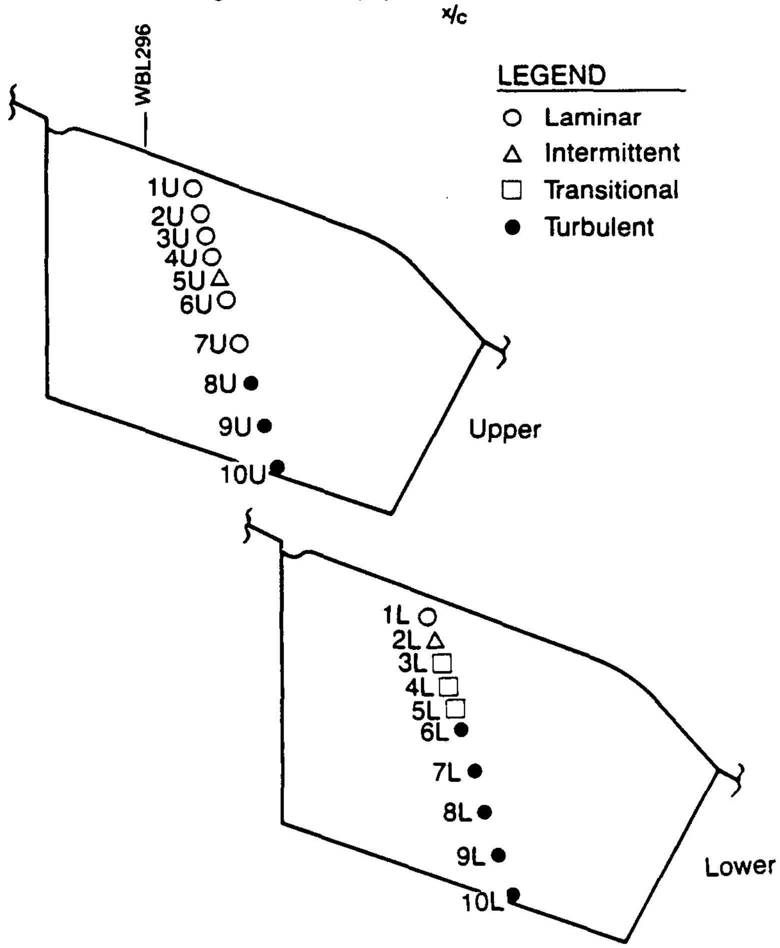
Figure 6-20. Pressure and Hot-Film Data—Flight 1, Condition No. B1.00.0048.109



Mach No. = .800
Altitude = 30 011 ft
C_L = .353
β = -0.6 deg
α_B = 1.72 deg
$N_{1_{E2}}$ = 3109 r/min

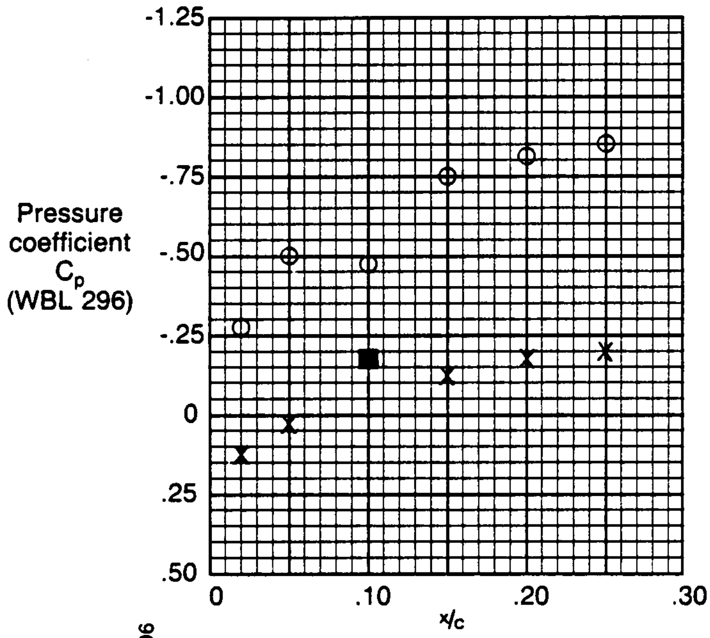
NOTES:

■ = Invalid data point—shown for *documentation only*



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	6	5	8	0
2U	.050	6	6	7	0
3U	.075	9	9	10	1
4U	.100	9	5	22	2
5U	.125	118	12	286	66
6U	.15	11	9	13	1
7U	.20	12	9	364	19
8U	.25	38	30	229	11
9U	.30	40	32	53	4
10U	.35	24	19	30	2
Lower					
1L	.020	4	3	6	0
2L	.050	19	7	135	20
3L	.075	406	176	646	85
4L	.100	506	233	694	68
5L	.125	297	102	514	77
6L	.15	39	32	54	4
7L	.20	22	17	27	2
8L	.25	40	32	56	3
9L	.30	67	51	92	7
10L	.35	76	60	102	8

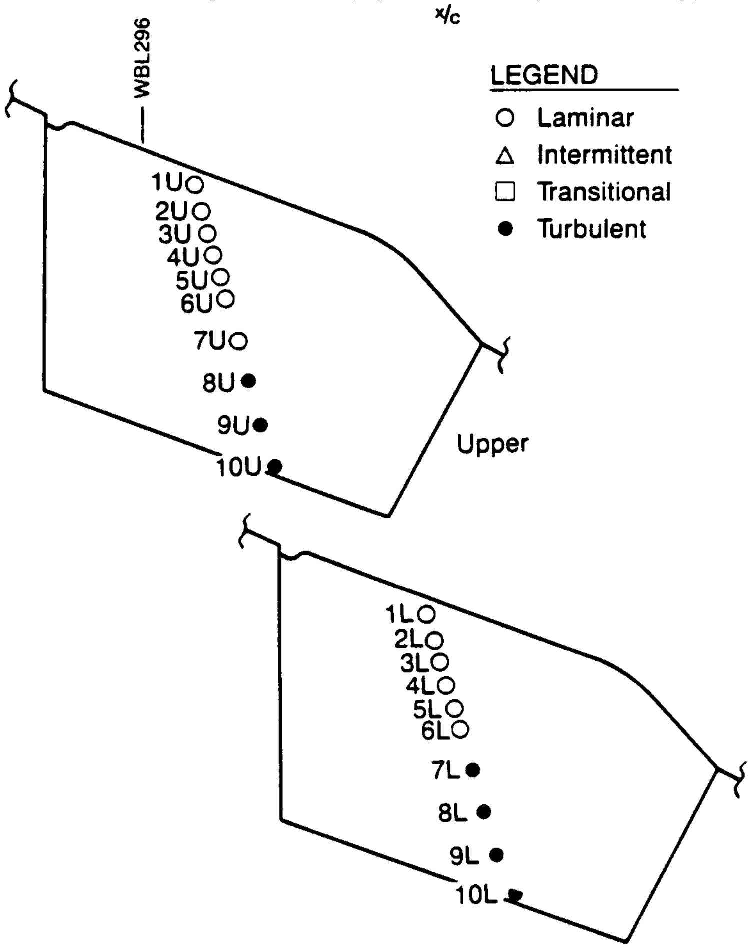
Figure 6-21. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.201



Mach No. = .793
Altitude = 30 080 ft
C_L = .359
β = +3.3 deg
α_B = 1.82 deg
$N_{1_{E2}}$ = 3114 r/min

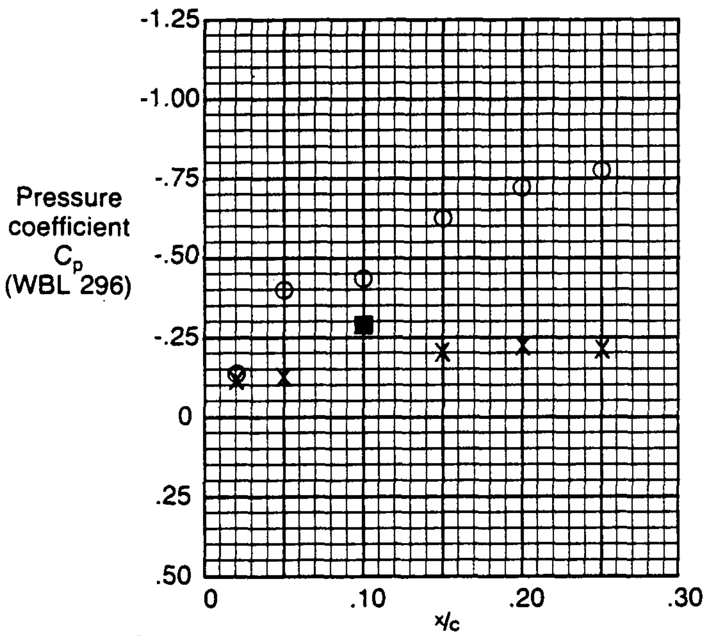
NOTES:

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	1
3U	.075	8	7	9	0
4U	.100	5	5	6	0
5U	.125	7	4	10	1
6U	.15	12	10	14	1
7U	.20	8	8	10	1
8U	.25	52	36	192	28
9U	.30	42	34	52	4
10U	.35	24	20	32	2
Lower					
1L	.020	3	2	4	0
2L	.050	6	6	7	0
3L	.075	4	4	5	0
4L	.100	7	6	8	0
5L	.125	8	7	10	1
6L	.15	10	9	12	1
7L	.20	19	16	22	2
8L	.25	34	28	43	3
9L	.30	61	48	82	6
10L	.35	71	53	98	7

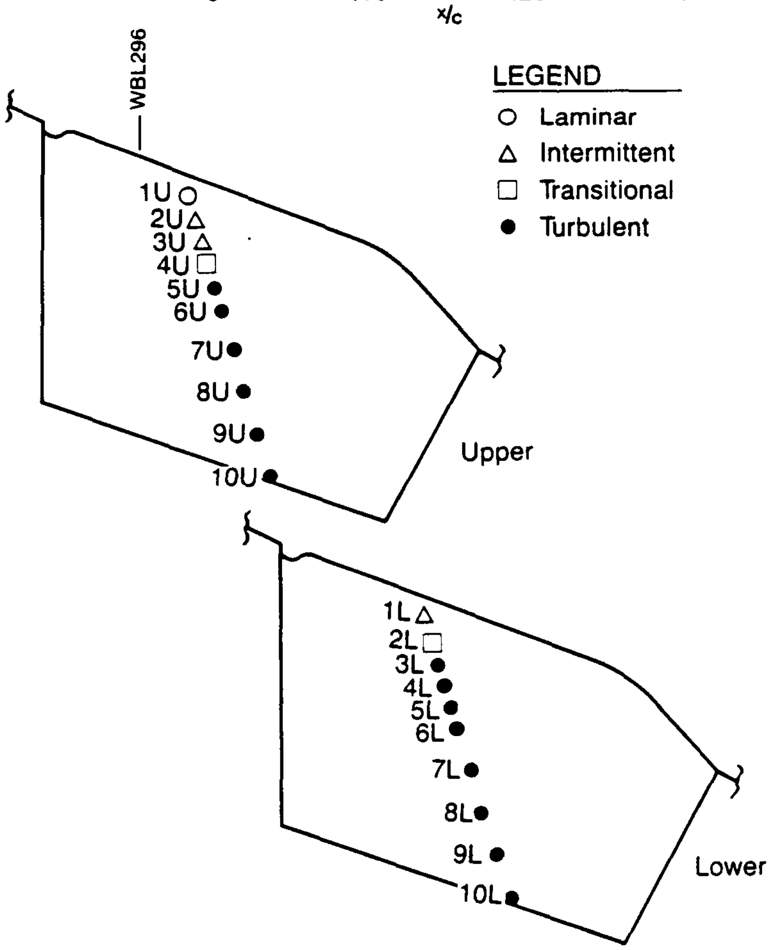
Figure 6-22. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.202



Mach No. = .794
Altitude = 30 075 ft
C_L = .358
β = -3.9 deg
α_B = 2.04 deg
$N_{1_{E2}}$ = 3167 r/min

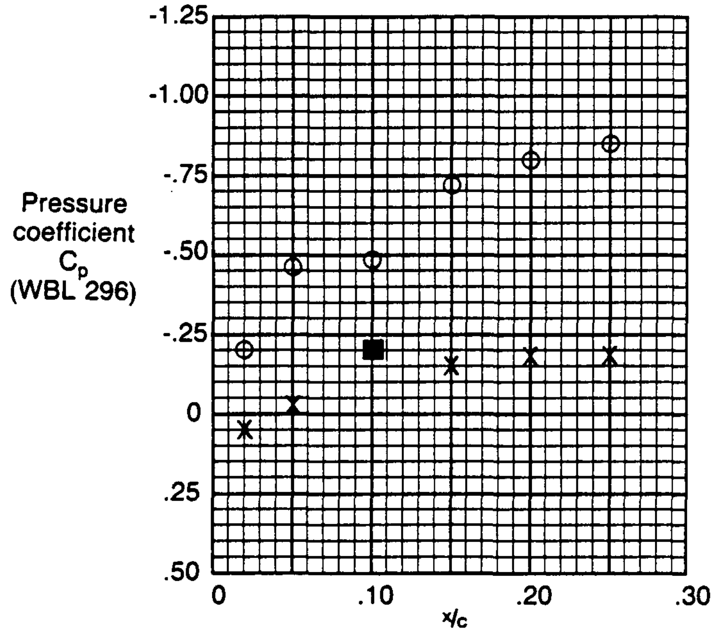
NOTES:

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	17	5	40	8
2U	.050	16	6	98	11
3U	.075	128	10	473	125
4U	.100	187	30	525	118
5U	.125	37	27	55	5
6U	.15	41	32	53	4
7U	.20	45	34	55	4
8U	.25	56	47	66	4
9U	.30	56	45	69	5
10U	.35	32	25	42	4
Lower					
1L	.020	26	6	124	20
2L	.050	85	16	361	92
3L	.075	28	23	34	2
4L	.100	27	23	34	2
5L	.125	37	30	47	3
6L	.15	46	36	58	4
7L	.20	24	20	30	2
8L	.25	43	36	53	3
9L	.30	70	58	92	7
10L	.35	77	63	102	8

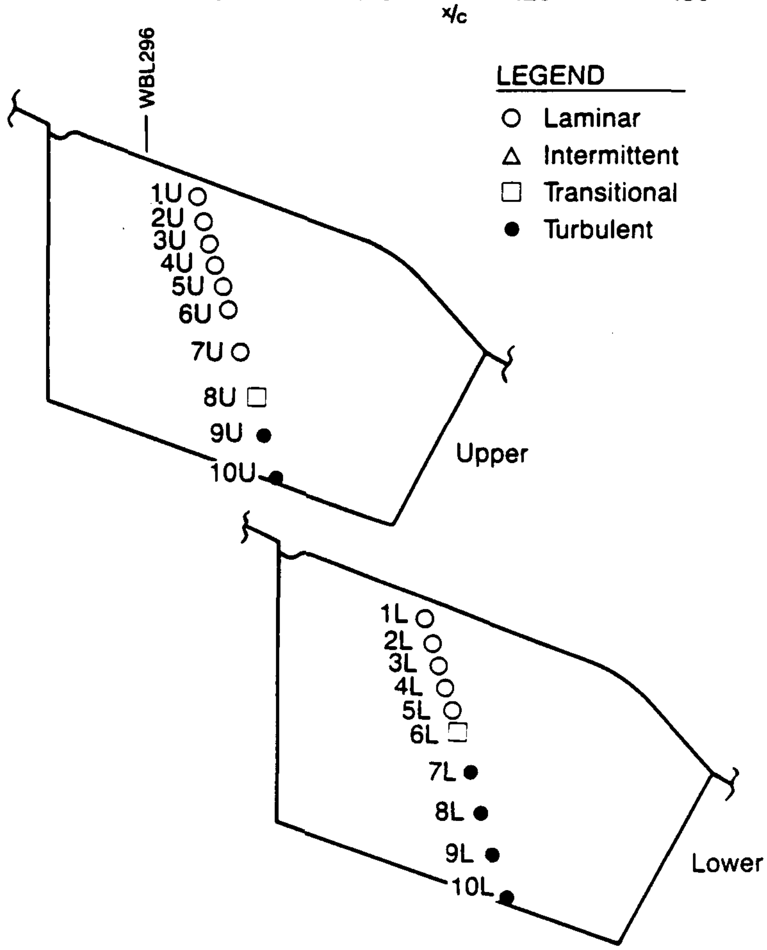
Figure 6-23. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.203



Mach No. = .805
Altitude = 34 001 ft
C_L = .416
β = -0.2 deg
α_B = 2.15 deg
$N_{1_{E2}}$ = 3224 r/min

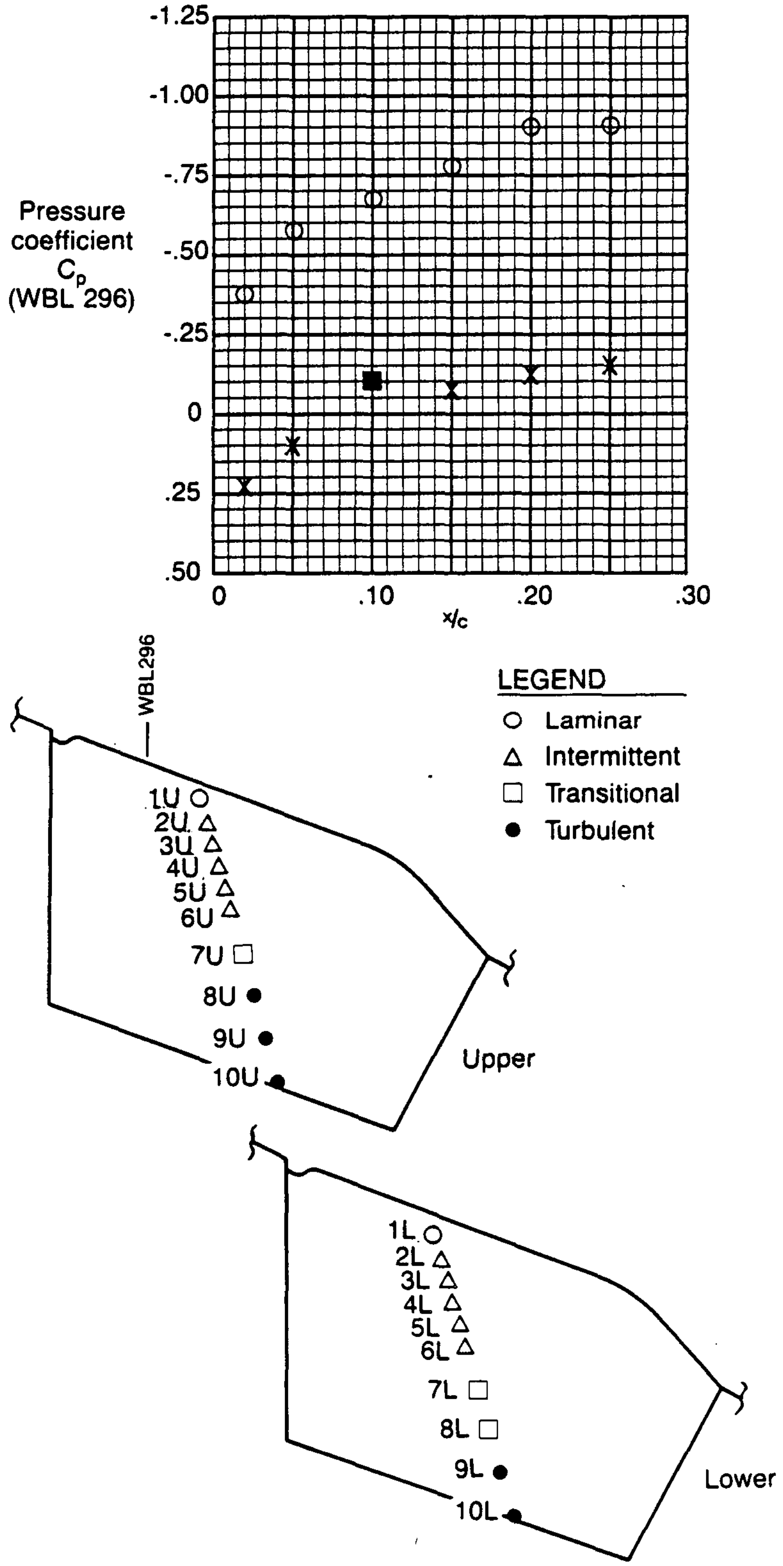
NOTES:

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	6	0
5U	.125	6	4	8	1
6U	.15	7	6	8	0
7U	.20	9	8	12	1
8U	.25	72	43	209	23
9U	.30	36	29	43	3
10U	.35	23	19	29	2
Lower					
1L	.020	3	2	3	0
2L	.050	6	6	7	0
3L	.075	6	5	7	0
4L	.100	9	8	11	1
5L	.125	11	10	14	1
6L	.15	507	369	678	50
7L	.20	20	17	26	1
8L	.25	36	30	46	3
9L	.30	64	48	91	7
10L	.35	73	58	93	7

Figure 6-24. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.204



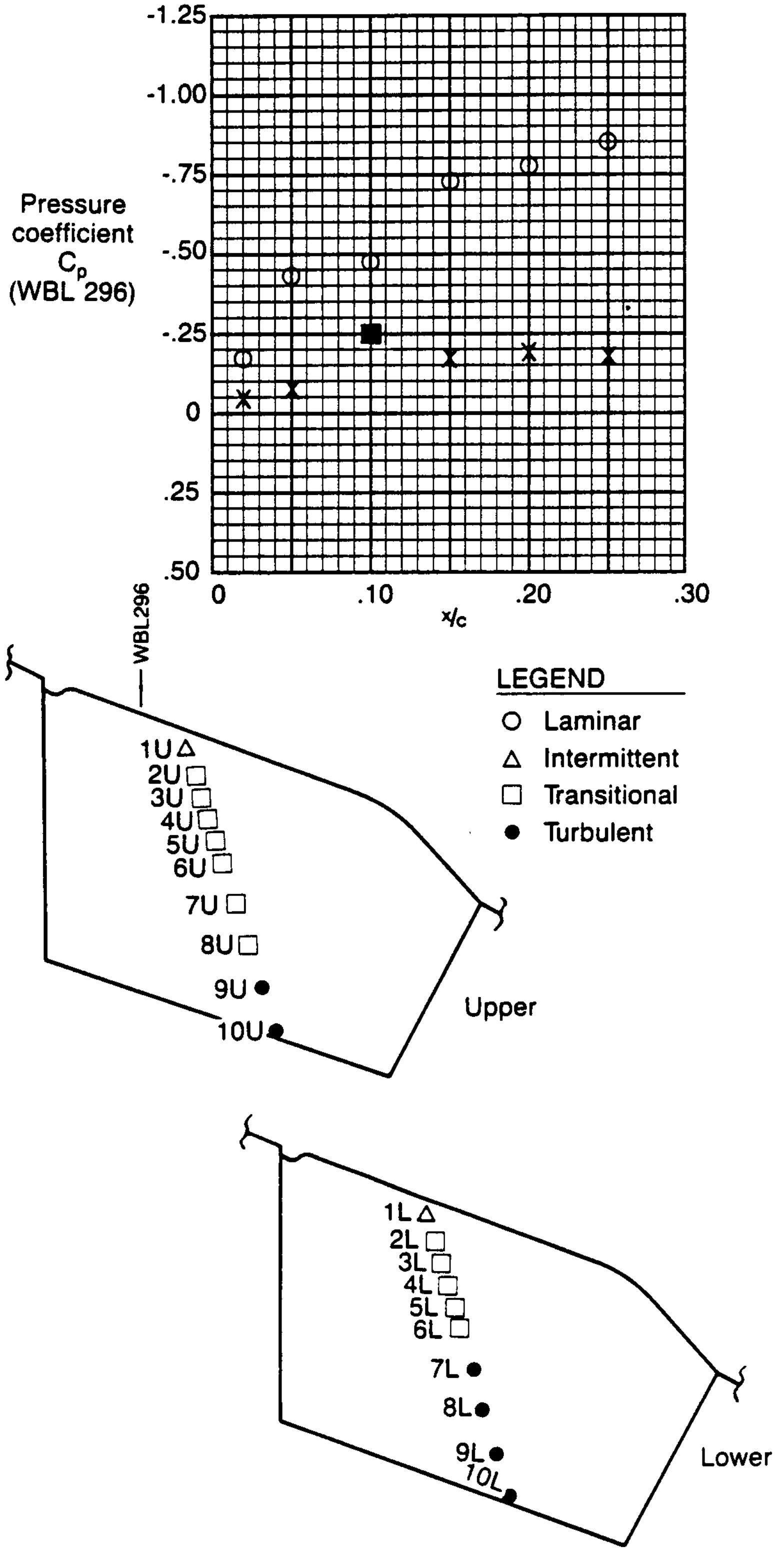
Mach No. = .793
Altitude = 34 008 ft
C_L = .427
β = +3.9 deg
α_B = 2.40 deg
$N_{1_{E2}}$ = 3230 r/min

NOTES:

■ = Invalid data point—shown for documentation only

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	7	5	59	6
2U	.050	22	5	150	28
3U	.075	43	7	270	57
4U	.100	82	5	409	94
5U	.125	133	5	544	131
6U	.15	160	6	490	133
7U	.20	134	35	468	110
8U	.25	49	36	135	9
9U	.30	44	35	65	4
10U	.35	23	18	31	2
Lower					
1L	.020	5	2	87	11
2L	.050	21	6	166	29
3L	.075	55	4	362	77
4L	.100	87	7	397	95
5L	.125	144	8	488	126
6L	.15	210	9	611	169
7L	.20	192	67	301	53
8L	.25	83	28	352	68
9L	.30	64	46	119	12
10L	.35	70	55	93	7

Figure 6-25. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.205



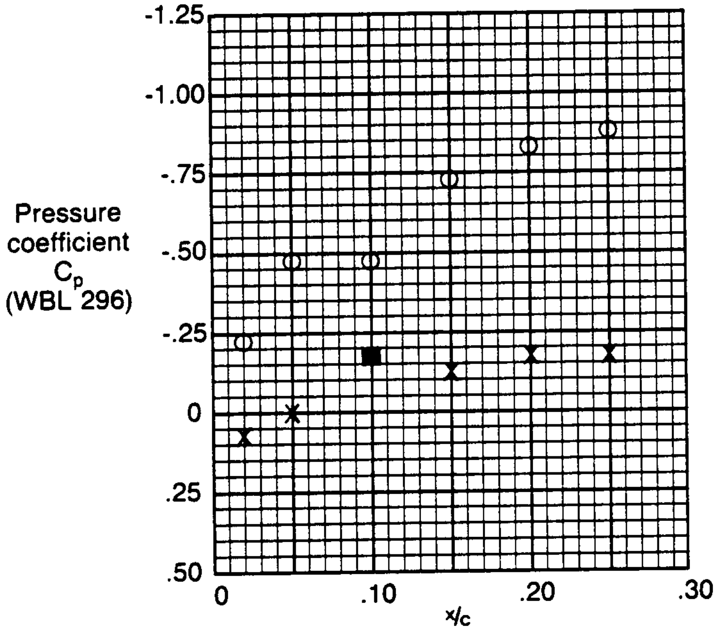
Mach No. = .801
Altitude = 34 000 ft
C_L = .417
β = -3.8 deg
α_B = 2.46 deg
$N_{1_{E2}}$ = 3274 r/min

NOTES:

■ = Invalid data point—shown for documentation only

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	79	5	232	51
2U	.050	374	16	609	129
3U	.075	413	92	670	121
4U	.100	356	44	682	186
5U	.125	241	40	791	204
6U	.15	195	36	599	186
7U	.20	175	42	702	198
8U	.25	107	45	533	107
9U	.30	55	39	96	8
10U	.35	26	21	35	2
Lower					
1L	.020	135	4	362	91
2L	.050	320	13	498	106
3L	.075	363	53	631	142
4L	.100	268	32	625	178
5L	.125	218	37	614	176
6L	.15	159	45	598	143
7L	.20	31	22	101	10
8L	.25	44	33	53	4
9L	.30	72	55	104	8
10L	.35	79	60	100	7

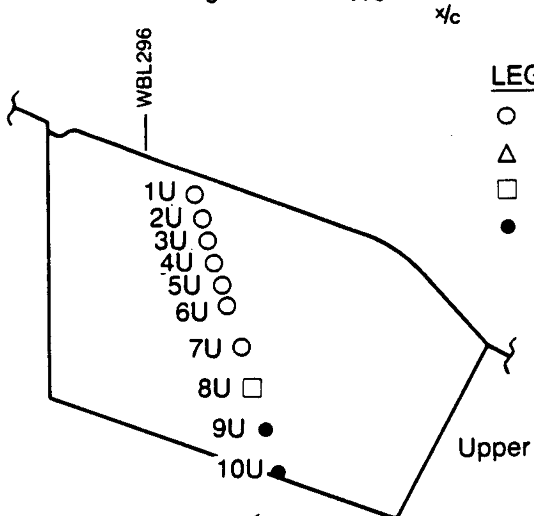
Figure 6-26. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.206



Mach No.	=	.809
Altitude	=	36 000 ft
C_L	=	.450
β	=	0.0 deg
α_B	=	2.31 deg
$N_{1_{E2}}$	=	3333 r/min

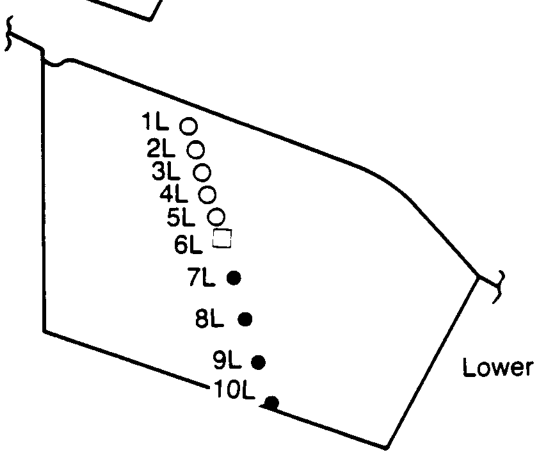
NOTES:

■ = Invalid data point—shown for documentation only



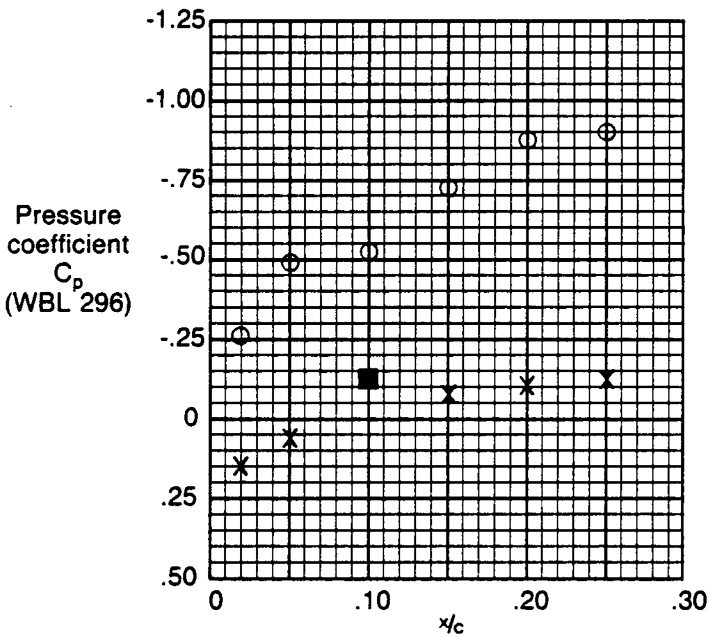
LEGEND

- ○ Laminar
- △ Intermittent
- □ Transitional
- ● Turbulent



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	0
4U	.100	5	5	6	1
5U	.125	5	4	7	1
6U	.15	6	5	6	0
7U	.20	8	8	9	1
8U	.25	69	40	201	22
9U	.30	37	31	45	3
10U	.35	22	18	27	2
Lower					
1L	.020	3	3	4	0
2L	.050	6	6	7	0
3L	.075	7	6	8	1
4L	.100	9	7	11	1
5L	.125	12	10	13	1
6L	.15	38	18	136	20
7L	.20	20	17	24	1
8L	.25	34	29	41	3
9L	.30	60	46	88	6
10L	.35	71	55	101	7

Figure 6-27. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.207

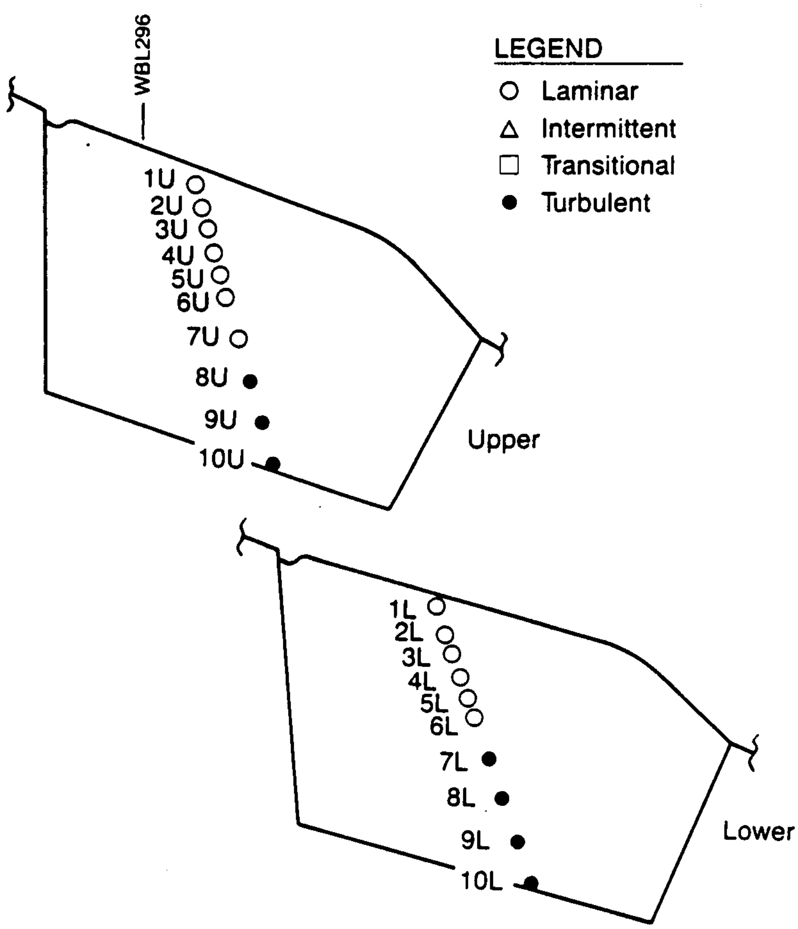


Mach No. = .801
Altitude = 36 998 ft
C_L = .480
β = -0.3 deg
α_B = 2.61 deg
$N_{1_{E2}}$ = 3380 r/min

NOTES:

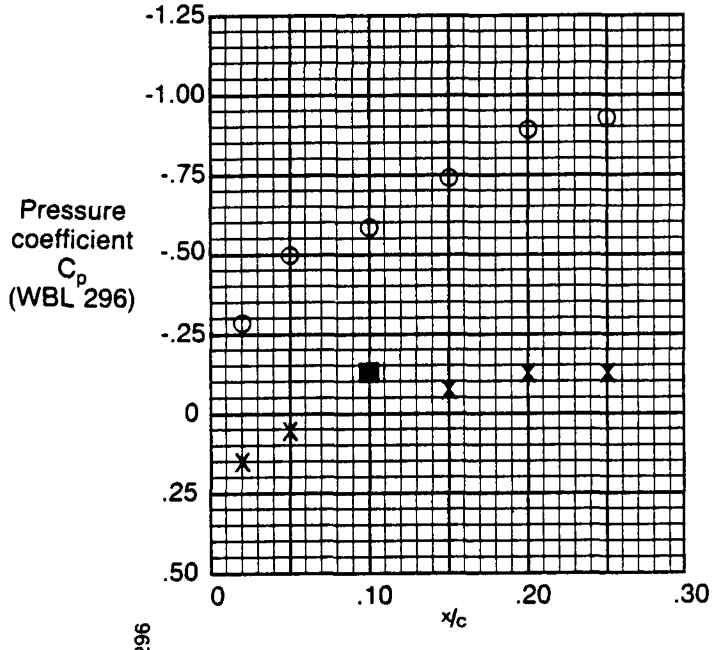
Measured data adjusted by Δ Cp = +.031

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	6	0
5U	.125	5	4	7	1
6U	.15	4	4	5	0
7U	.20	8	8	9	1
8U	.25	38	32	46	3
9U	.30	41	33	50	3
10U	.35	22	18	30	2
Lower					
1L	.020	3	2	3	0
2L	.050	6	6	6	0
3L	.075	6	5	7	0
4L	.100	9	7	10	0
5L	.125	11	9	16	1
6L	.15	14	12	18	1
7L	.20	21	17	26	2
8L	.25	33	27	42	3
9L	.30	60	44	80	6
10L	.35	71	58	92	7

Figure 6-28. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.210

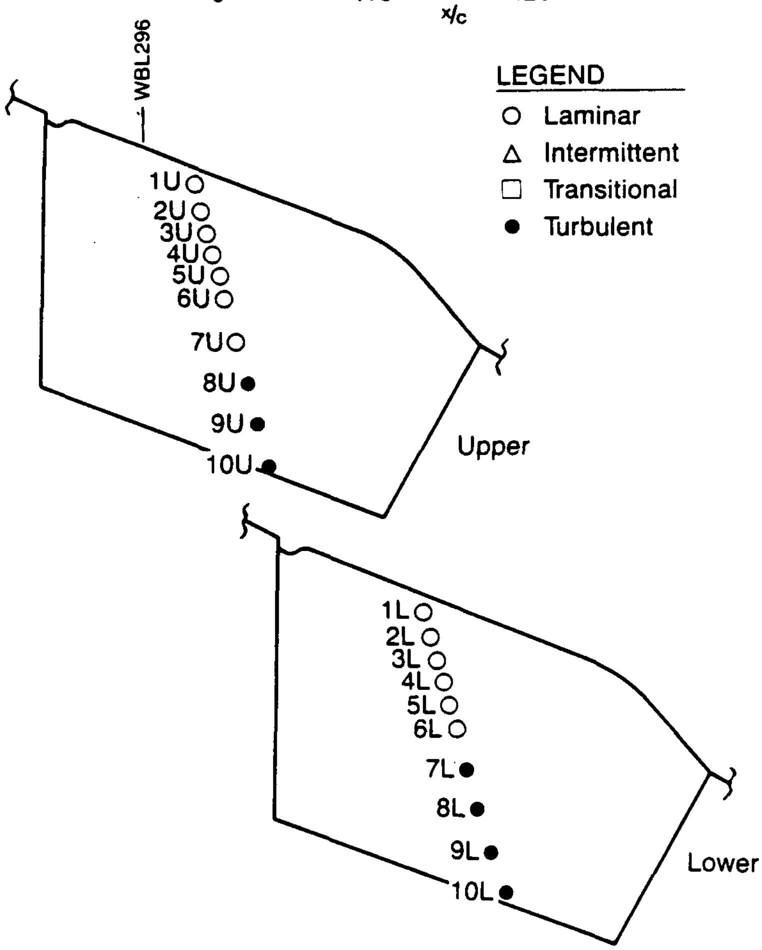


Mach No.	=	.804
Altitude	=	37 994 ft
C_L	=	.498
β	=	-0.2 deg
α_B	=	2.67 deg
$N_{1_{E2}}$	=	3538 r/min

NOTES:

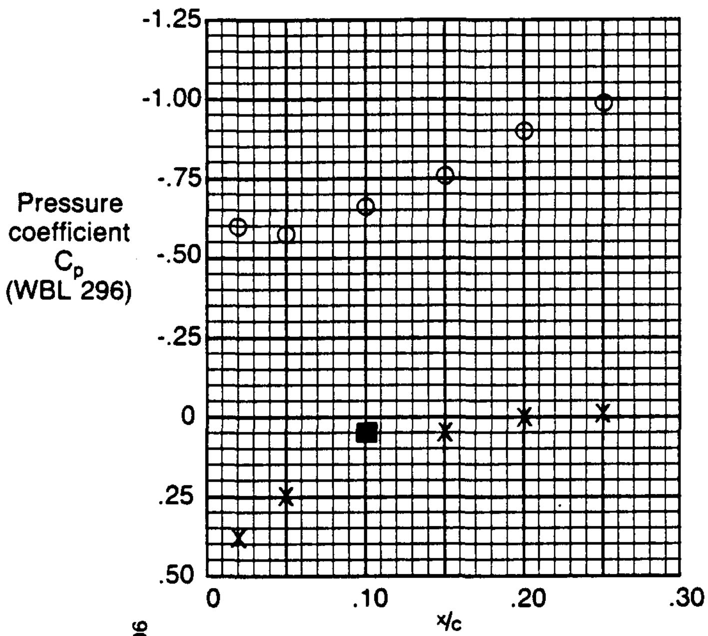
Measured data adjusted by Δ Cp = +.023

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	5	0
5U	.125	5	4	7	1
6U	.15	5	4	5	0
7U	.20	8	8	9	1
8U	.25	38	33	45	2
9U	.30	39	31	50	3
10U	.35	22	18	29	2
Lower					
1L	.020	3	2	4	0
2L	.050	6	6	7	0
3L	.075	7	6	8	1
4L	.100	9	8	11	1
5L	.125	12	10	14	1
6L	.15	15	12	19	1
7L	.20	21	17	32	2
8L	.25	33	27	41	2
9L	.30	58	46	80	6
10L	.35	69	53	86	6

Figure 6-29. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.211

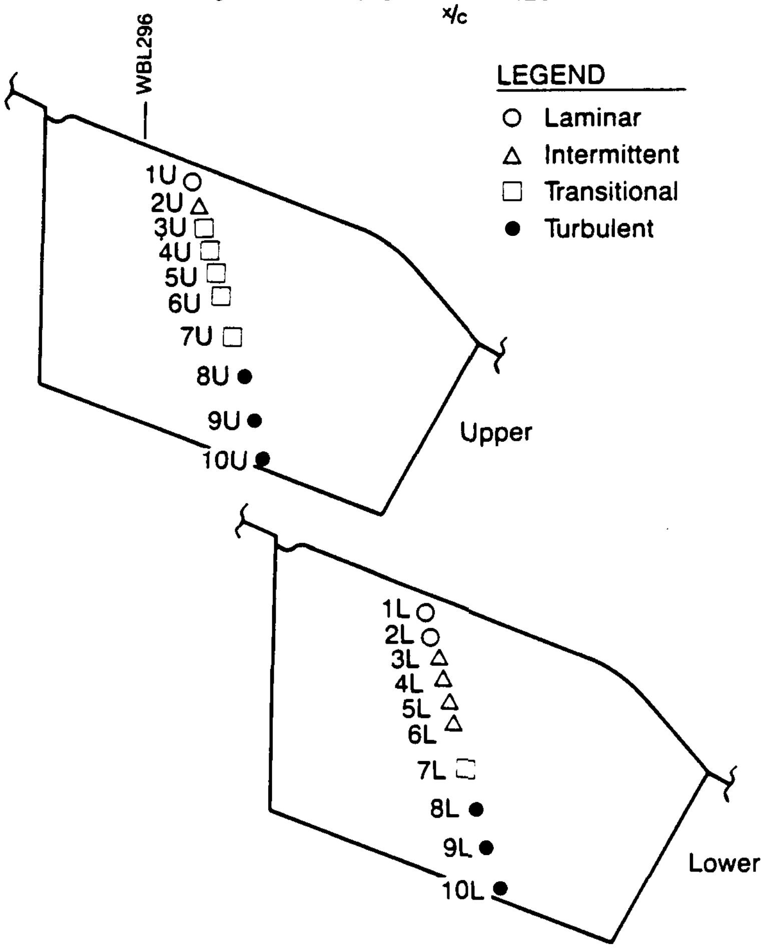


Mach No. = .791
Altitude = 37 988 ft
C_L = .513
β = +3.9 deg
α_B = 3.21 deg
$N_{1_{E2}}$ = 3545 r/min

NOTES:

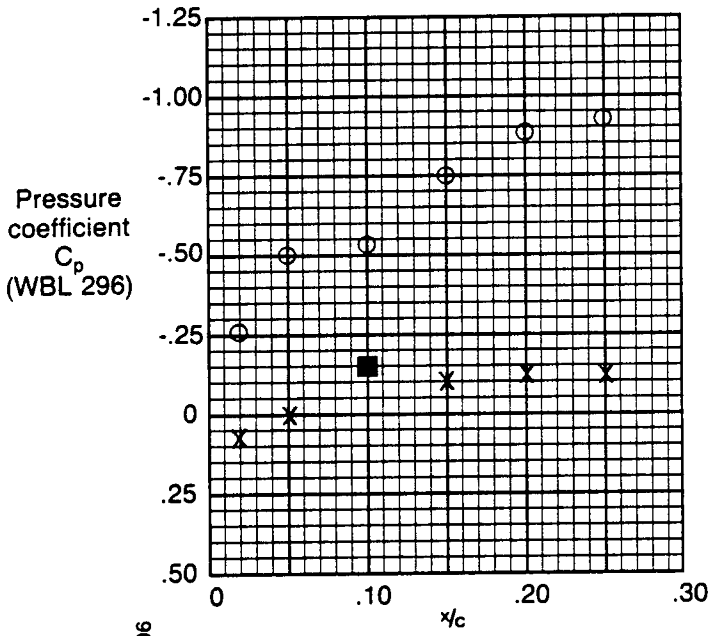
Measured data adjusted by Δ Cp = +.078

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	6	4	30	1
2U	.050	21	5	186	26
3U	.075	229	7	529	154
4U	.100	350	5	625	193
5U	.125	320	35	722	195
6U	.15	168	33	633	152
7U	.20	78	42	416	59
8U	.25	54	43	74	5
9U	.30	46	35	60	4
10U	.35	22	17	28	2
Lower					
1L	.020	3	2	41	2
2L	.050	8	6	165	12
3L	.075	15	5	272	33
4L	.100	36	7	415	64
5L	.125	69	8	493	106
6L	.15	116	10	642	161
7L	.20	172	21	281	64
8L	.25	42	26	281	27
9L	.30	57	43	91	8
10L	.35	67	52	98	7

Figure 6-30. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.212.

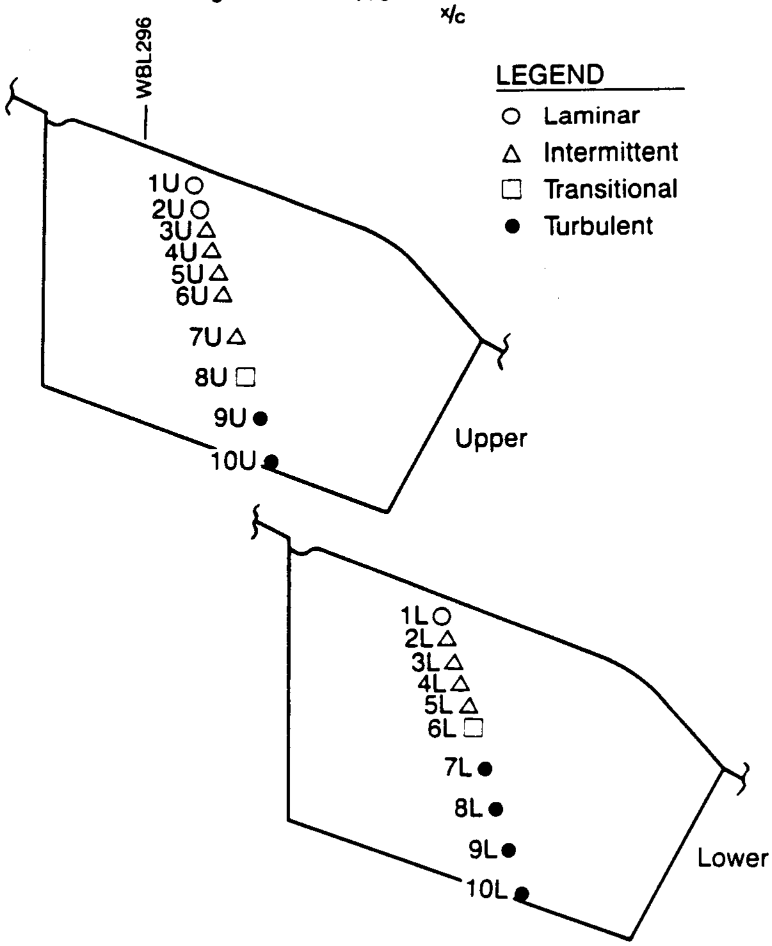


Mach No. = .800
Altitude = 37 927 ft
C_L = .500
β = -3.7 deg
α_B = 3.11 deg
$N_{1_{E2}}$ = 3485 r/min

NOTES:

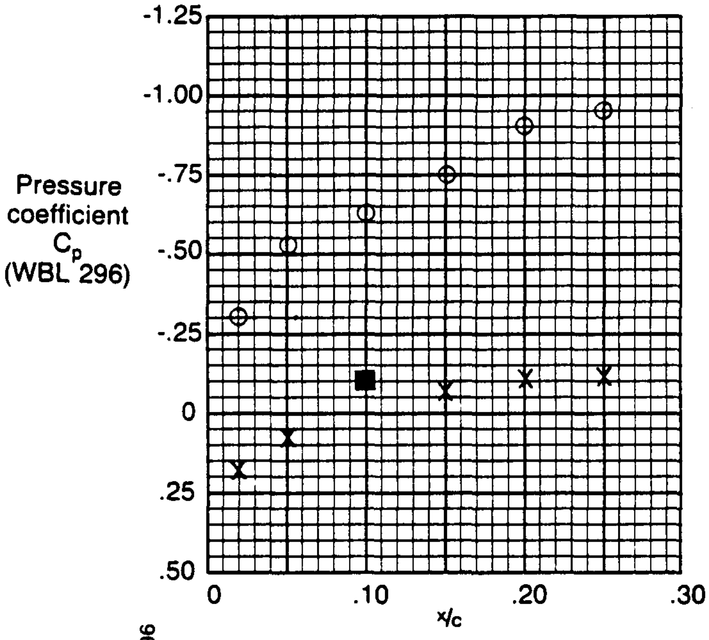
Pressure adjusted by Δ Cp = +.017

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	6	0
2U	.050	8	5	82	9
3U	.075	22	7	139	28
4U	.100	47	5	300	65
5U	.125	88	4	396	97
6U	.15	121	4	530	127
7U	.20	190	9	513	152
8U	.25	140	34	599	101
9U	.30	46	32	74	8
10U	.35	22	18	27	2
Lower					
1L	.020	4	3	70	4
2L	.050	19	6	150	27
3L	.075	55	6	323	70
4L	.100	90	8	423	103
5L	.125	153	11	521	141
6L	.15	534	402	661	49
7L	.20	42	18	178	33
8L	.25	38	30	72	6
9L	.30	63	48	82	6
10L	.35	71	56	88	7

Figure 6-31. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.213

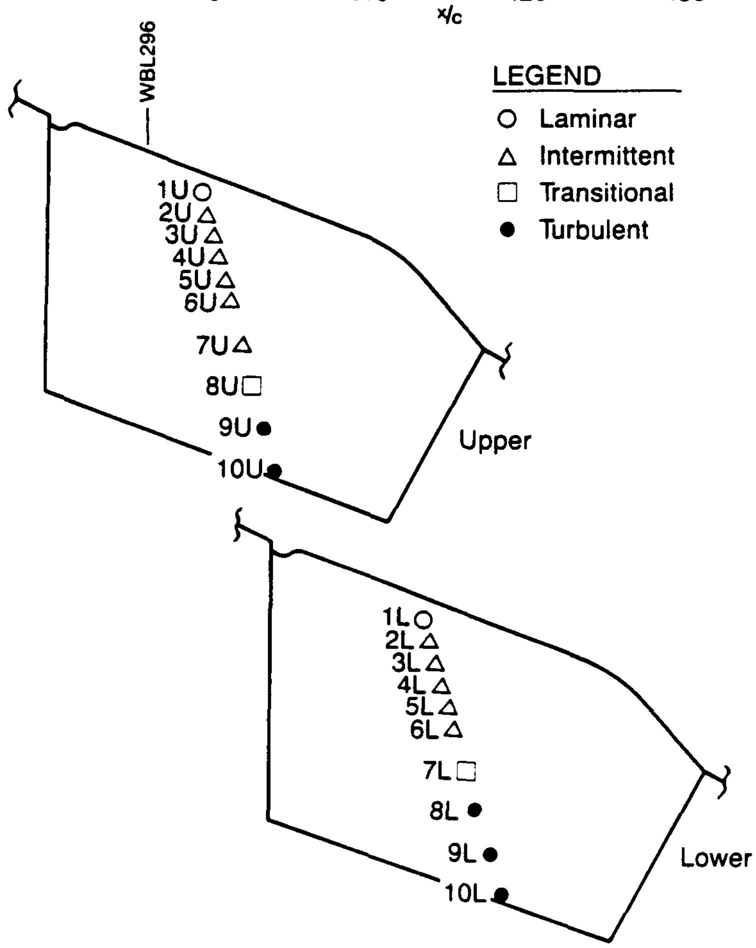


Mach No. = .805
Altitude = 38 988 ft
C_L = .516
β = -0.1 deg
α_B = 2.82 deg
$N_{1_{E2}}$ = 3614 r/min

NOTES:

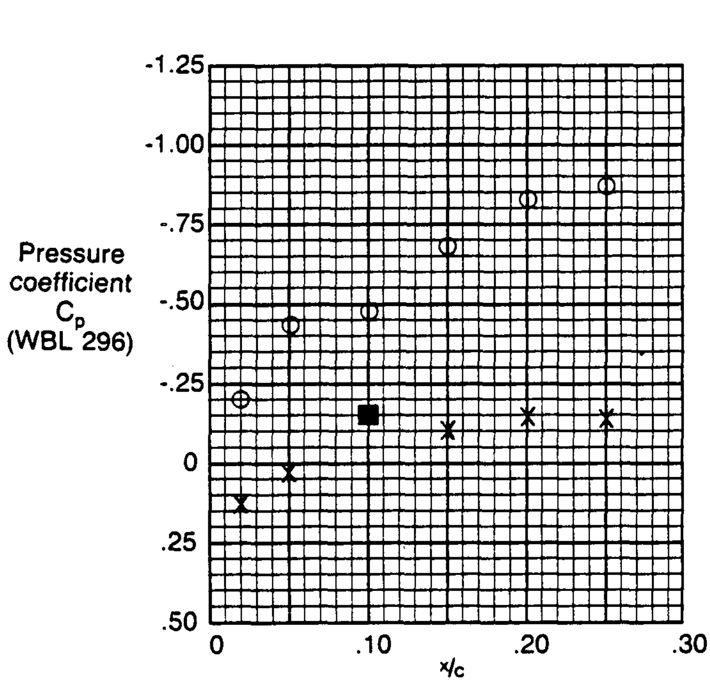
Pressures adjusted by Δ Cp = +.115

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	6	5	40	3
2U	.050	21	5	153	26
3U	.075	39	7	316	47
4U	.100	60	5	371	74
5U	.125	91	4	480	103
6U	.15	110	5	380	104
7U	.20	168	9	458	121
8U	.25	84	32	328	66
9U	.30	40	31	63	4
10U	.35	22	18	29	2
Lower					
1L	.020	6	2	95	11
2L	.050	26	6	195	35
3L	.075	76	6	329	82
4L	.100	109	8	386	100
5L	.125	149	10	463	118
6L	.15	255	13	639	173
7L	.20	97	18	268	61
8L	.25	63	28	230	41
9L	.30	63	44	109	10
10L	.35	69	53	96	7

Figure 6-32. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.214



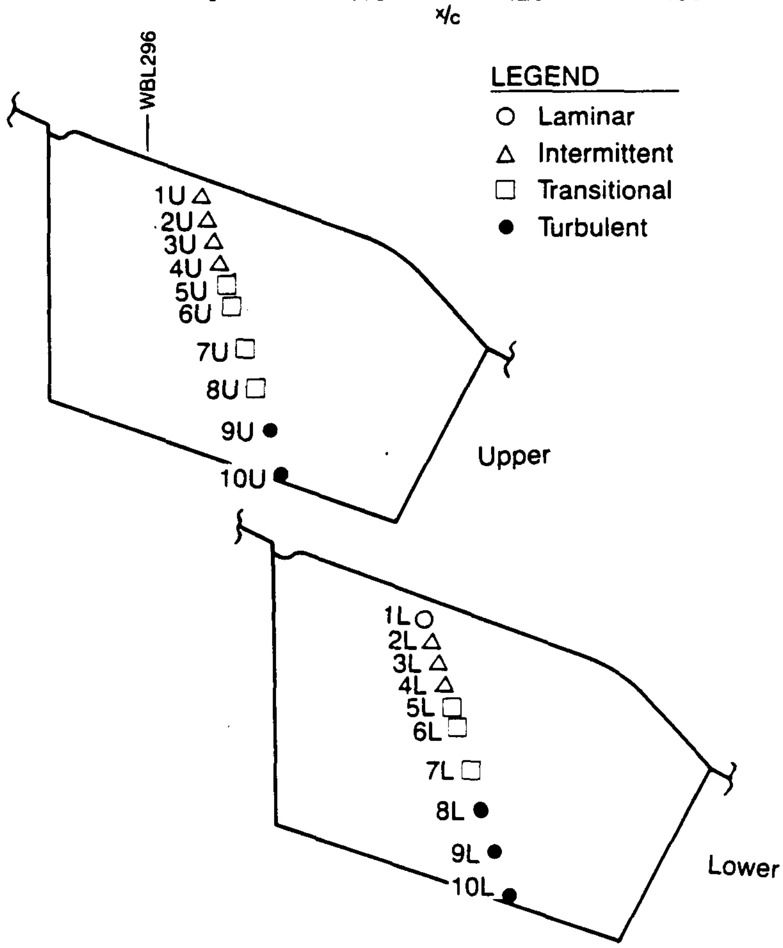
Mach No. = .821
Altitude = 38 988 ft
C_L = .496
β = -0.1 deg
α_B = 2.55 deg
$N_{1_{E2}}$ = 3701 r/min

NOTES:

Pressures adjusted by Δ Cp = +.111

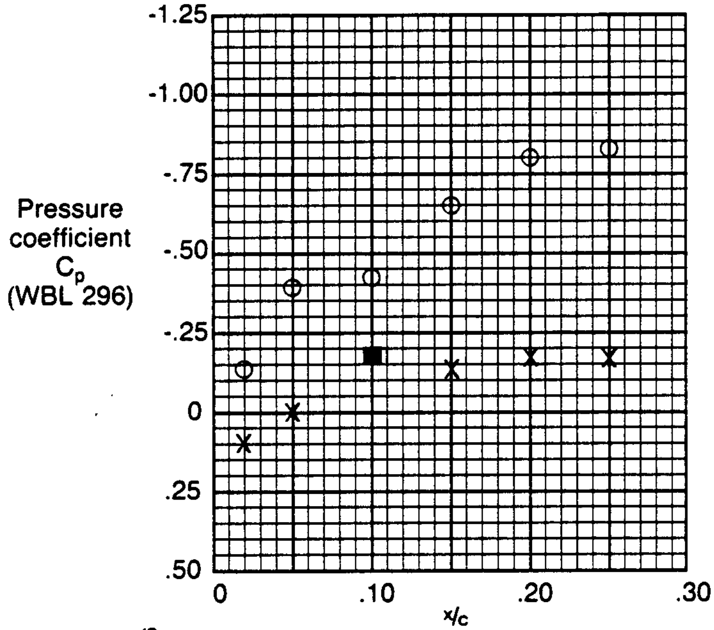
■ = Invalid data point—shown for documentation only

Cirrus clouds may have been present



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	7	5	52	6
2U	.050	32	5	159	34
3U	.075	61	7	273	59
4U	.100	109	6	455	97
5U	.125	153	9	460	112
6U	.15	164	9	428	111
7U	.20	224	12	477	111
8U	.25	212	39	463	107
9U	.30	47	31	96	10
10U	.35	21	17	27	2
Lower					
1L	.020	6	3	79	9
2L	.050	27	6	151	32
3L	.075	78	7	299	73
4L	.100	118	11	374	87
5L	.125	179	14	425	109
6L	.15	299	19	636	150
7L	.20	88	18	237	53
8L	.25	55	30	242	39
9L	.30	62	48	102	8
10L	.35	70	54	98	7

Figure 6-33. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.215

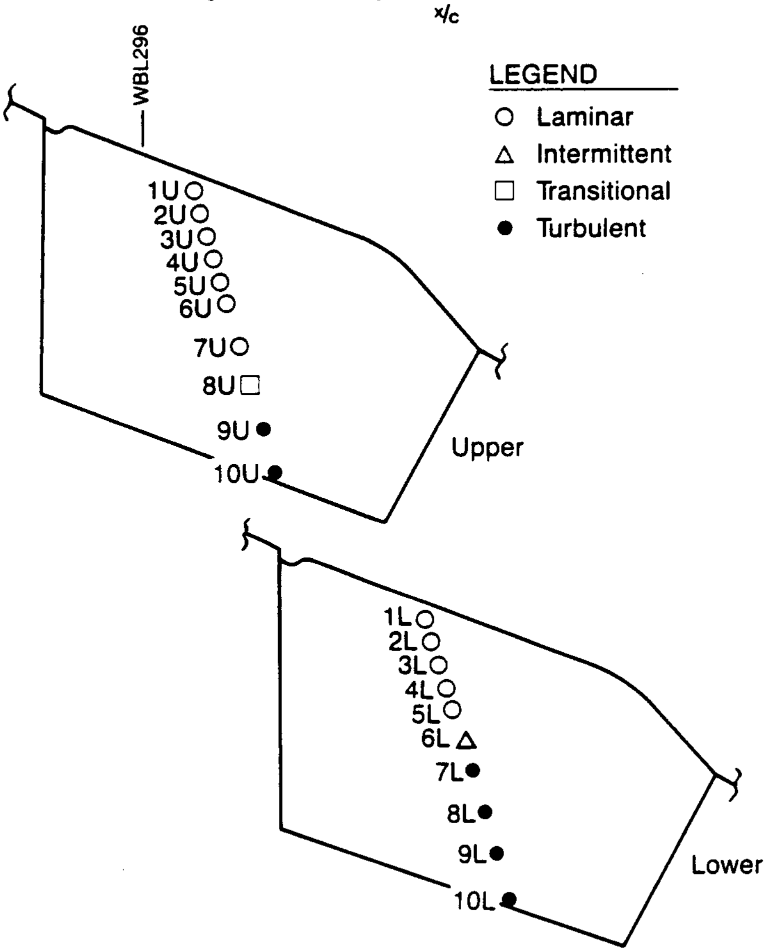


Mach No. = .832
Altitude = 38 986 ft
C_L = .478
β = 0.0 deg
α_B = 2.40 deg
$N_{1_{E2}}$ = 3972 r/min

NOTES:

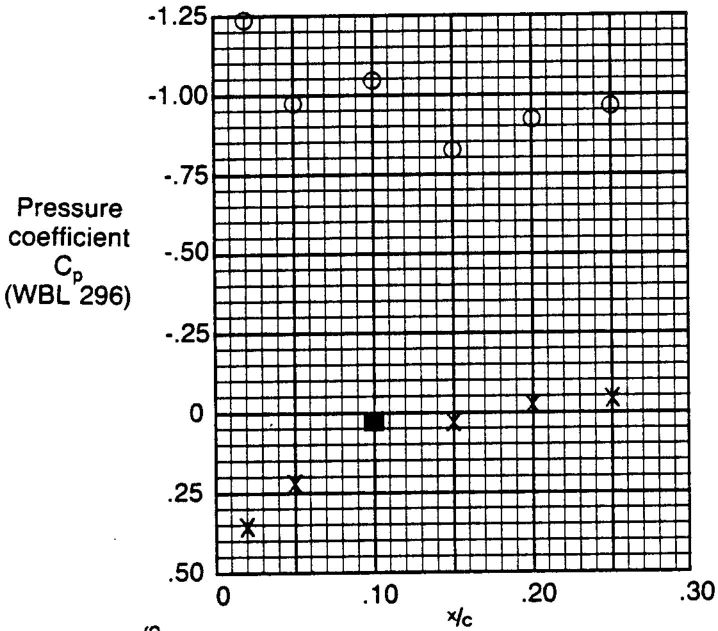
Pressures adjusted by Δ Cp = +.094

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	6	0
5U	.125	6	4	7	1
6U	.15	5	4	37	2
7U	.20	10	8	199	11
8U	.25	300	177	402	54
9U	.30	34	27	47	3
10U	.35	20	17	26	1
Lower					
1L	.020	4	3	4	1
2L	.050	7	6	7	0
3L	.075	10	8	13	1
4L	.100	13	11	16	1
5L	.125	18	14	22	2
6L	.15	29	19	176	14
7L	.20	19	17	25	1
8L	.25	33	27	40	2
9L	.30	58	41	80	6
10L	.35	69	51	88	6

Figure 6-34. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.216

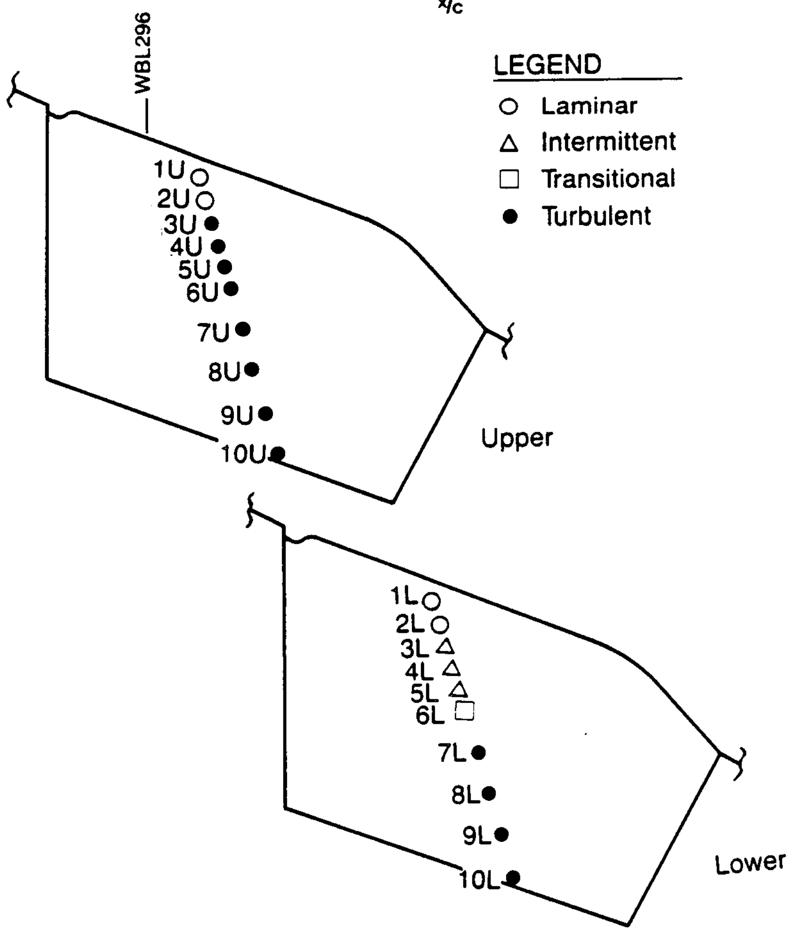


Mach No. = .709
Altitude = 37 007 ft
C_L = .601
β = -0.5 deg
α_B = 4.18 deg
$N_{1_{E2}}$ = 3248 r/min

NOTES:

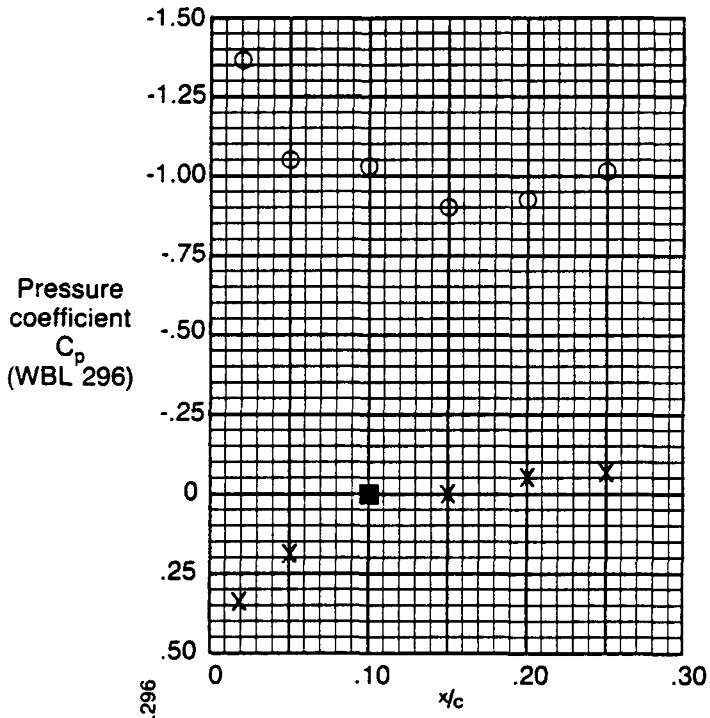
Pressures adjusted by Δ Cp = -.211

■ = Invalid data point—shown for documentation only



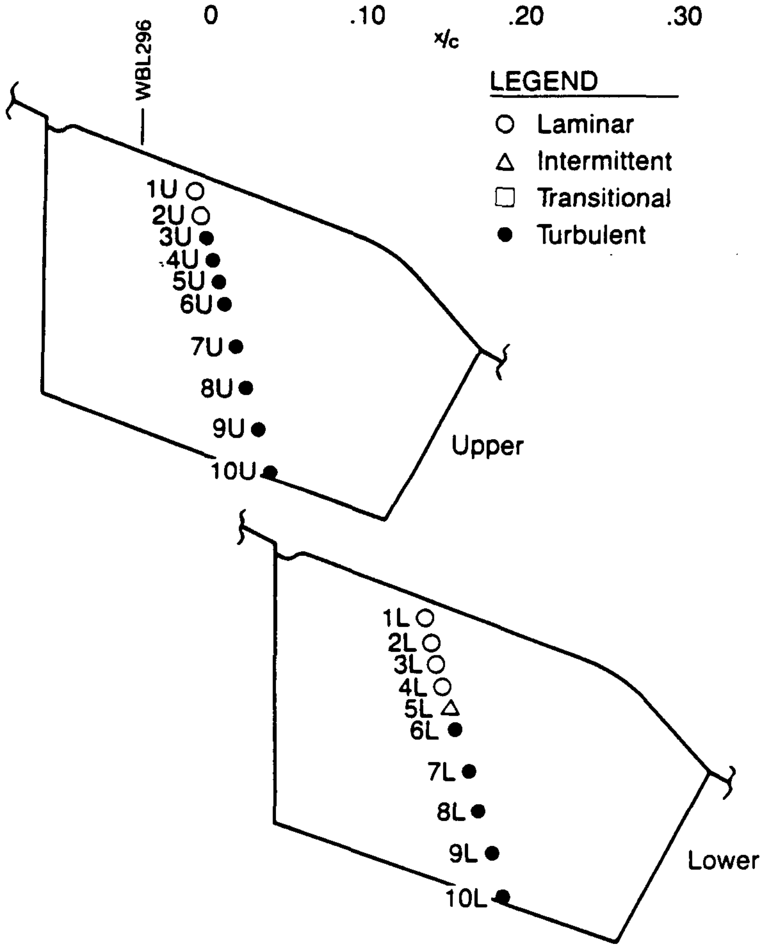
Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
		Upper			
1U	.020	5	5	21	1
2U	.050	10	5	99	14
3U	.075	34	26	99	9
4U	.100	36	29	43	3
5U	.125	43	36	55	4
6U	.15	44	35	55	3
7U	.20	55	47	66	4
8U	.25	60	51	75	4
9U	.30	71	56	95	7
10U	.35	34	28	46	3
		Lower			
1L	.020	2	2	43	3
2L	.050	8	5	137	10
3L	.075	19	4	250	43
4L	.100	33	6	337	54
5L	.125	90	7	351	94
6L	.15	269	24	663	197
7L	.20	22	15	56	5
8L	.25	33	26	46	3
9L	.30	59	45	78	6
10L	.35	69	55	96	6

Figure 6-35. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.217



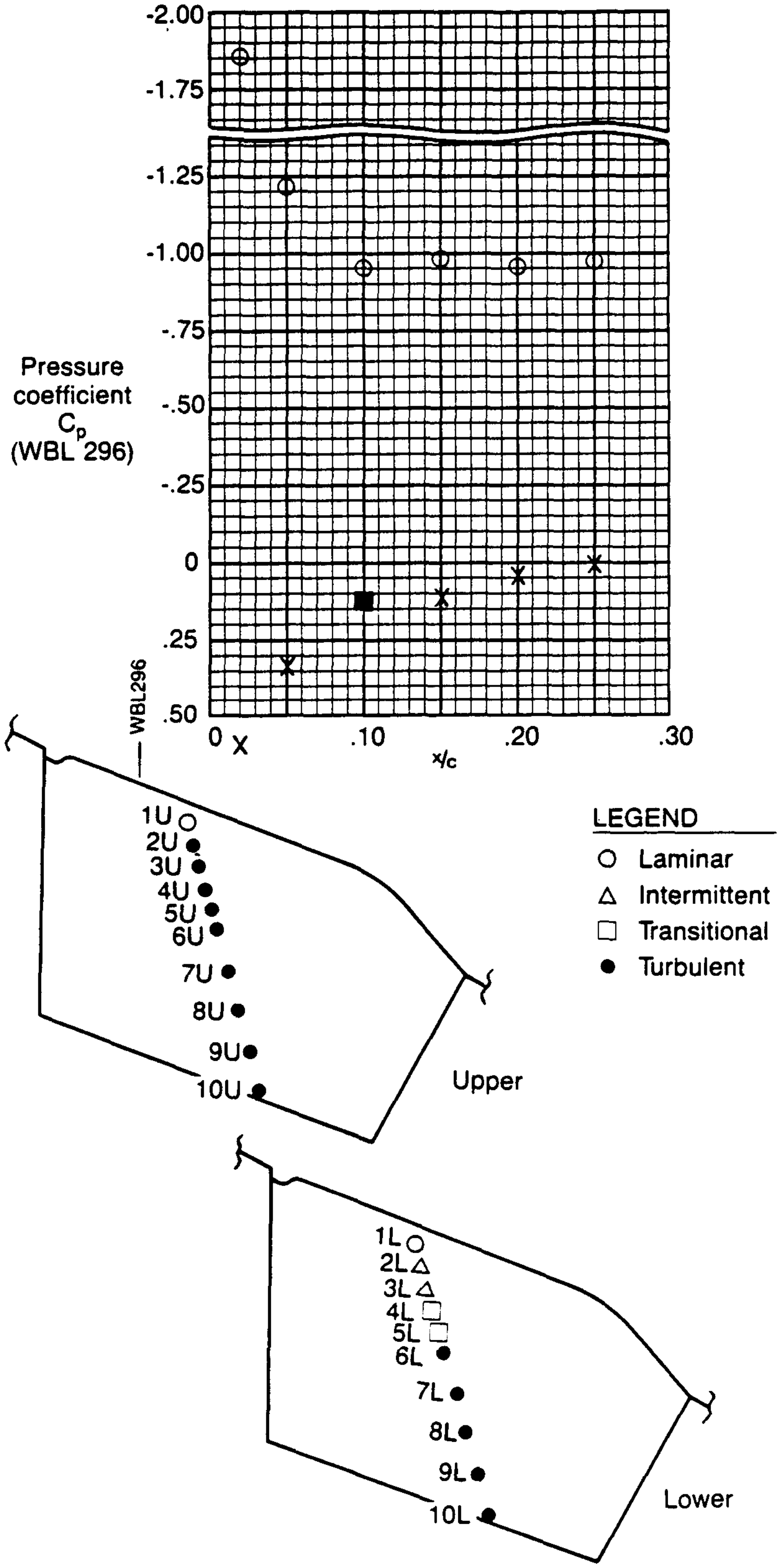
Mach No. = .701
Altitude = 37 007 ft
C_L = .617
β = -0.6 deg
α_B = 4.38 deg
$N_{1_{E2}}$ = 3265 r/min

NOTES:
Pressures adjusted by Δ Cp = -.255
■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	6	0
2U	.050	6	5	6	0
3U	.075	30	26	36	2
4U	.100	37	31	44	2
5U	.125	44	36	55	3
6U	.15	45	36	56	4
7U	.20	54	46	65	4
8U	.25	61	50	78	4
9U	.30	66	50	84	6
10U	.35	34	27	42	3
Lower					
1L	.020	2	2	2	0
2L	.050	6	5	9	0
3L	.075	5	4	8	1
4L	.100	9	6	33	2
5L	.125	14	7	96	10
6L	.15	33	25	56	4
7L	.20	19	16	25	1
8L	.25	33	28	39	2
9L	.30	60	45	80	6
10L	.35	69	54	90	6

Figure 6-36. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.218



Mach No. = .636
Altitude = 35 020 ft
C_L = .674
β = +0.7 deg
α_B = 5.28 deg
$N_{1_{E2}}$ = 4123 r/min

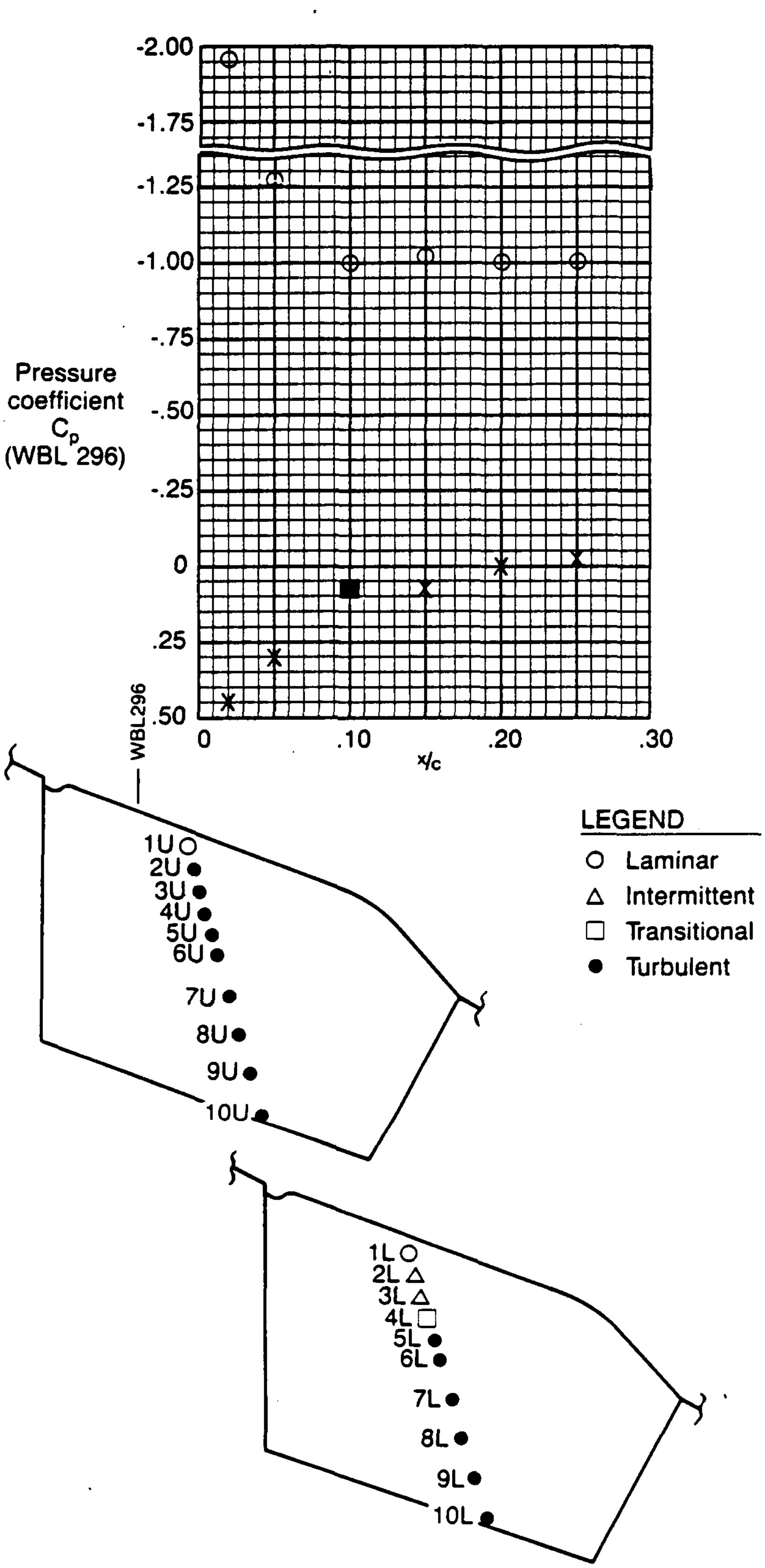
NOTES:

Pressures adjusted by Δ Cp = -.540

■ = Invalid data point—shown for documentation only

Hot film no.	$\frac{x}{c}$	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	6	0
2U	.050	36	29	43	3
3U	.075	41	35	53	3
4U	.100	47	39	61	4
5U	.125	55	41	71	5
6U	.15	57	46	72	5
7U	.20	65	54	77	5
8U	.25	76	63	95	6
9U	.30	77	59	99	7
10U	.35	40	30	50	4
Lower					
1L	.020	3	2	5	1
2L	.050	13	6	32	5
3L	.075	13	5	47	7
4L	.100	165	10	435	117
5L	.125	166	27	410	120
6L	.15	43	32	68	6
7L	.20	26	21	30	2
8L	.25	40	31	50	3
9L	.30	69	51	91	7
10L	.35	77	60	98	8

Figure 6-37. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.219.1



Mach No. = .621
Altitude = 35 009 ft
C_L = .705
β = -0.8 deg
α_B = 5.64 deg
$N_{1_{E2}}$ = 2683 r/min

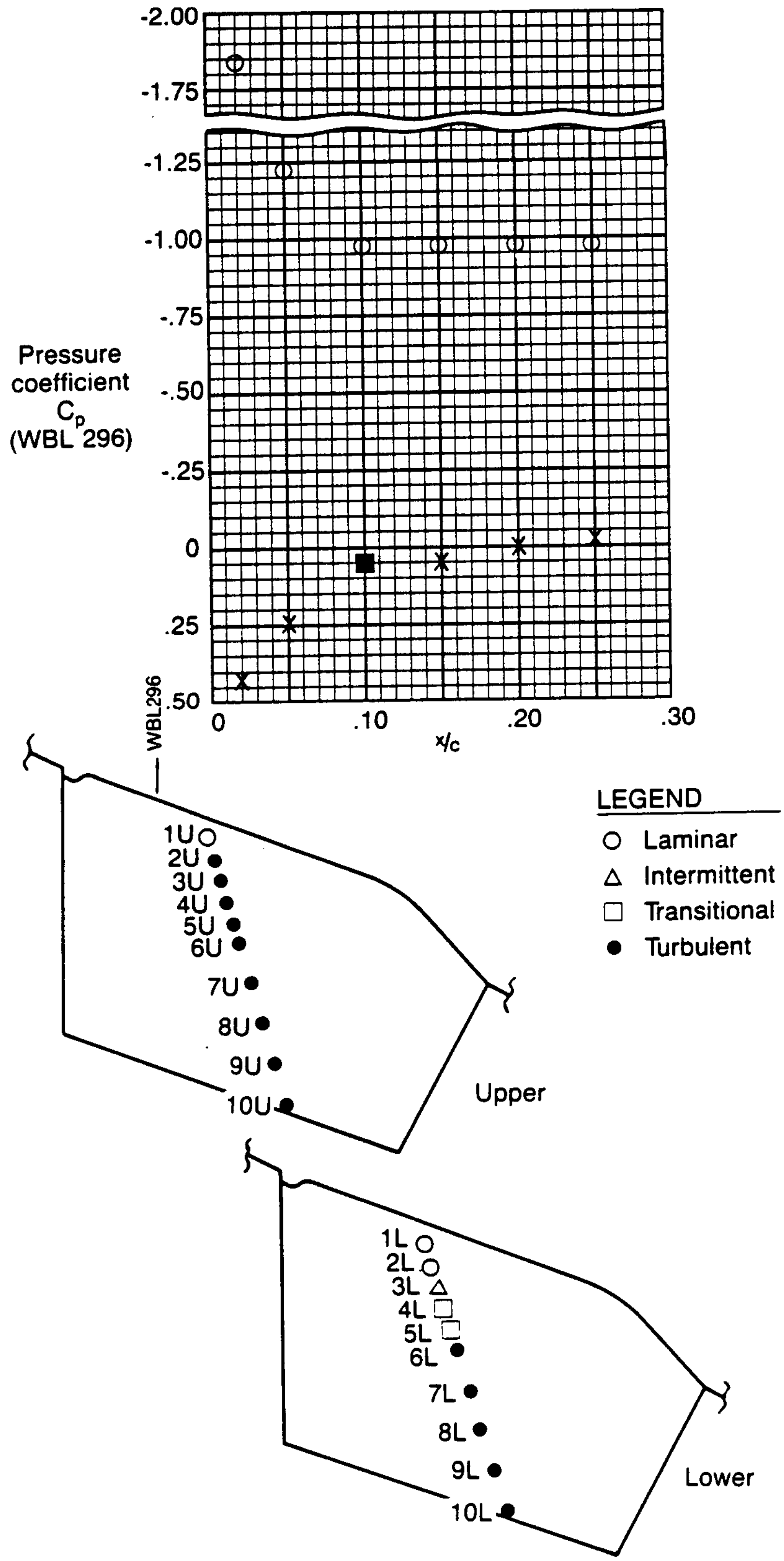
NOTES:

Pressures adjusted by Δ Cp = -.617

■ = Invalid data point—shown for documentation only

Hot film no.	$\frac{x}{c}$	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U	.020	8	5	12	2
2U	.050	33	28	39	2
3U	.075	41	35	52	3
4U	.100	47	39	57	4
5U	.125	57	45	68	5
6U	.15	56	44	80	6
7U	.20	67	57	83	5
8U	.25	77	66	98	6
9U	.30	78	62	102	7
10U	.35	41	32	54	4
		Lower			
1L	.020	2	2	3	0
2L	.050	16	7	37	5
3L	.075	14	4	36	5
4L	.100	52	19	365	65
5L	.125	33	27	41	3
6L	.15	43	35	54	4
7L	.20	24	20	29	2
8L	.25	41	33	50	3
9L	.30	69	54	87	7
10L	.35	76	62	98	7

Figure 6-38. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.220.1



Mach No. = .632
Altitude = 35 007 ft
C_L = .679
β = -0.6 deg
α_B = 5.40 deg
$N_{1_{E2}}$ = 2123 r/min

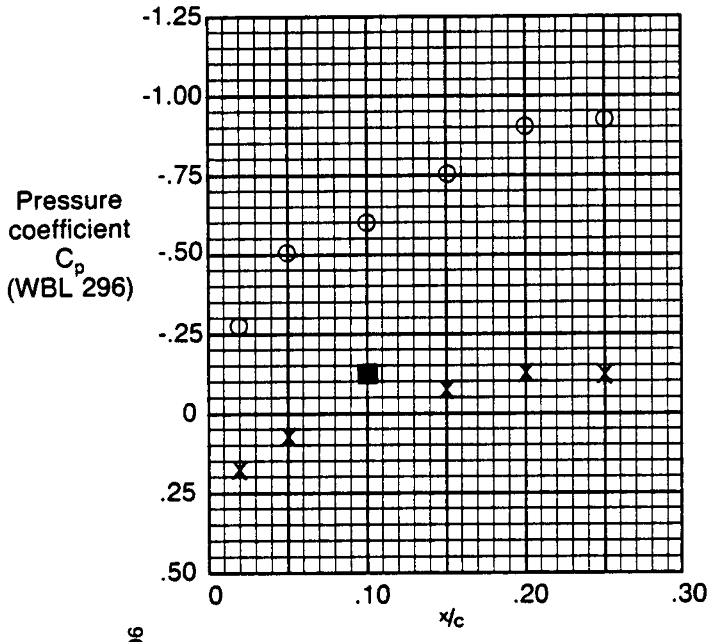
NOTES:

Pressures adjusted by Δ Cp = -.591

■ = Invalid data point—shown for documentation only

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	6	5	8	1
2U	.050	32	27	38	2
3U	.075	39	32	49	3
4U	.100	44	37	53	3
5U	.125	53	41	72	4
6U	.15	53	43	65	5
7U	.20	64	51	88	5
8U	.25	76	63	96	6
9U	.30	75	58	100	7
10U	.35	40	32	48	4
Lower					
1L	.020	2	1	3	0
2L	.050	8	5	17	2
3L	.075	12	4	42	7
4L	.100	85	10	291	82
5L	.125	61	23	356	76
6L	.15	37	30	46	3
7L	.20	22	18	28	2
8L	.25	39	32	46	3
9L	.30	67	54	90	7
10L	.35	75	55	93	7

Figure 6-39. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.221

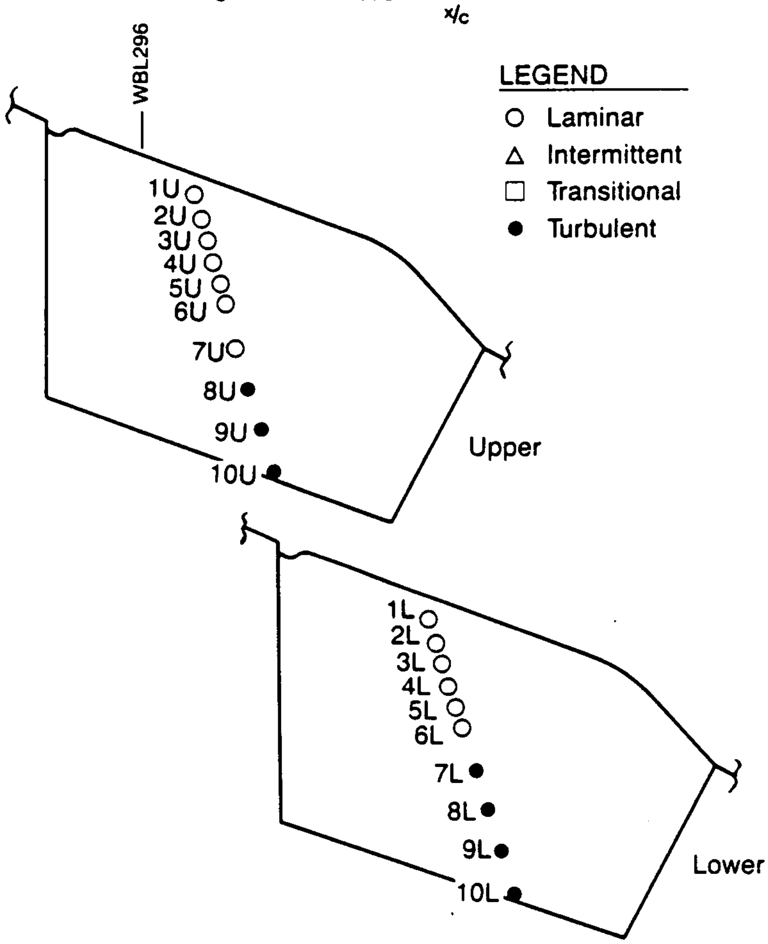


Mach No. = .805
Altitude = 38 992 ft
C_L = .502
β = +0.1 deg
α_B = 2.68 deg
$N_{1_{E2}}$ = 3571 r/min

NOTES:

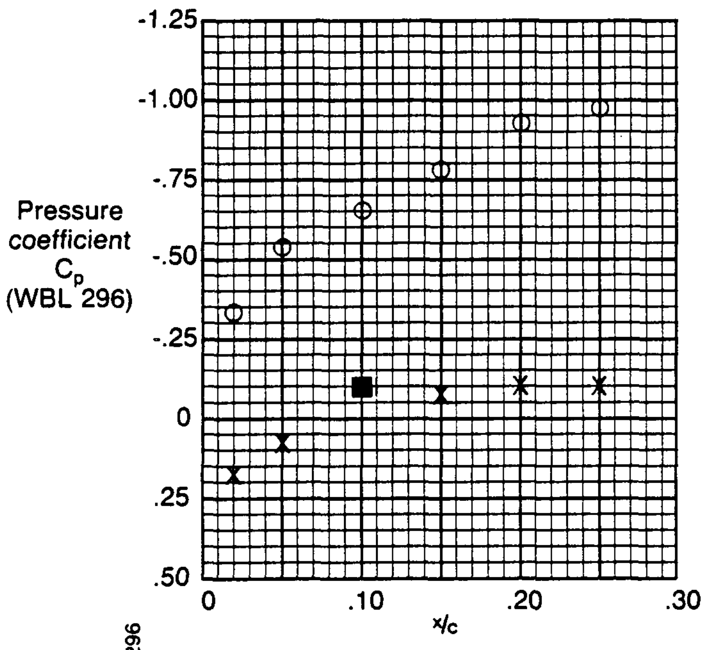
Pressures adjusted by Δ Cp = +.089

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	7	0
5U	.125	5	4	8	1
6U	.15	6	4	150	9
7U	.20	9	8	106	6
8U	.25	37	29	44	3
9U	.30	39	33	50	3
10U	.35	22	18	28	2
Lower					
1L	.020	3	2	3	0
2L	.050	7	6	7	0
3L	.075	7	6	34	2
4L	.100	10	8	47	3
5L	.125	12	10	50	3
6L	.15	15	12	52	3
7L	.20	21	17	42	3
8L	.25	32	26	50	3
9L	.30	57	47	76	5
10L	.35	66	54	83	6

Figure 6-40. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.222



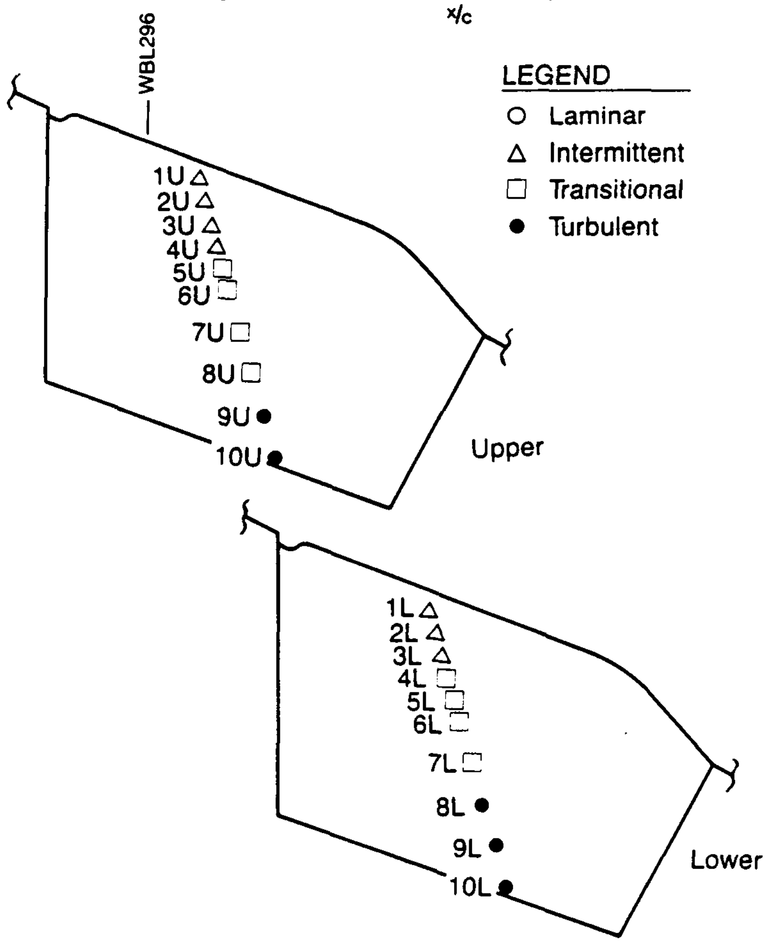
Mach No.	=	.804
Altitude	=	40 483 ft
C_L	=	.534
β	=	-0.2 deg
α_B	=	2.94 deg
N_{1E2}	=	3934 r/min

NOTES:

Pressures adjusted by Δ Cp = +.209

■ = Invalid data point—shown for documentation only

Data affected by cirrus clouds



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	14	5	74	13
2U	.050	79	5	270	63
3U	.075	152	9	401	108
4U	.100	256	7	523	145
5U	.125	387	24	638	160
6U	.15	376	23	539	112
7U	.20	377	96	520	94
8U	.25	141	45	412	66
9U	.30	44	33	87	5
10U	.35	22	18	28	2
Lower					
1L	.020	20	3	110	23
2L	.050	90	6	270	62
3L	.075	221	9	507	126
4L	.100	268	18	483	116
5L	.125	341	40	491	105
6L	.15	459	110	637	102
7L	.20	108	26	237	53
8L	.25	55	31	240	26
9L	.30	66	46	96	8
10L	.35	70	52	99	7

Figure 6-41. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.223

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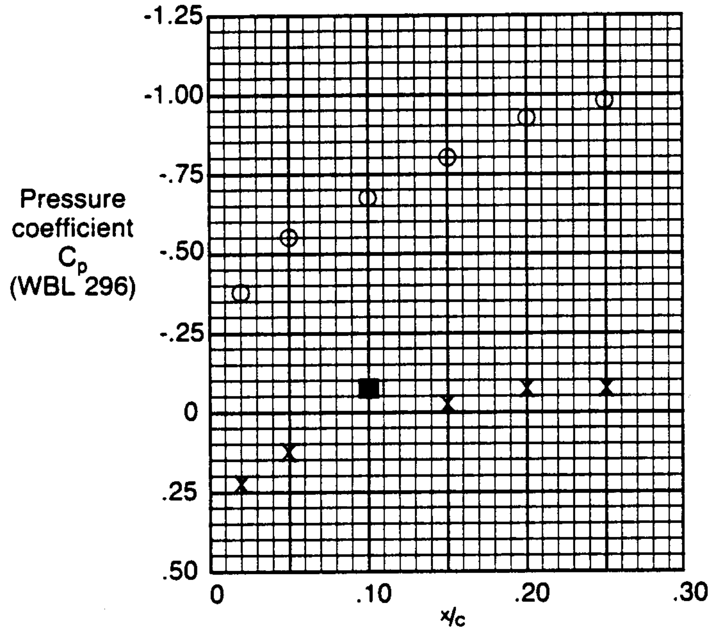


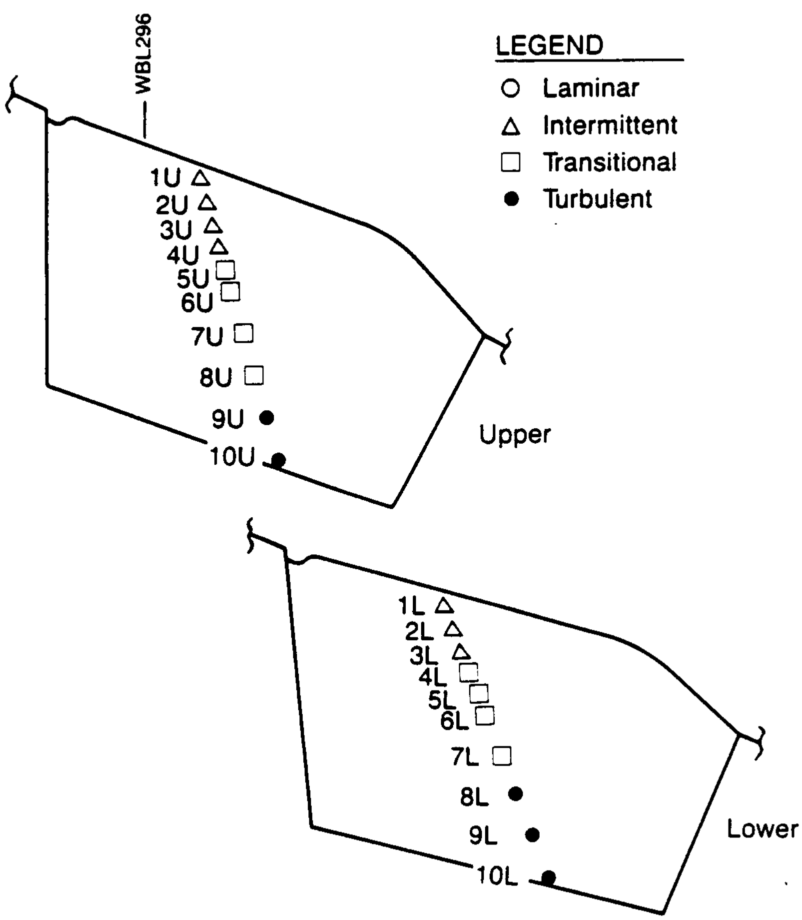
Mach No. = .796
Altitude = 40 482 ft
C_L = .544
β = -0.4 deg
α_B = 3.05 deg
$N_{1_{E2}}$ = 3714 r/min

NOTES:

Pressures adjusted by Δ Cp = +.227

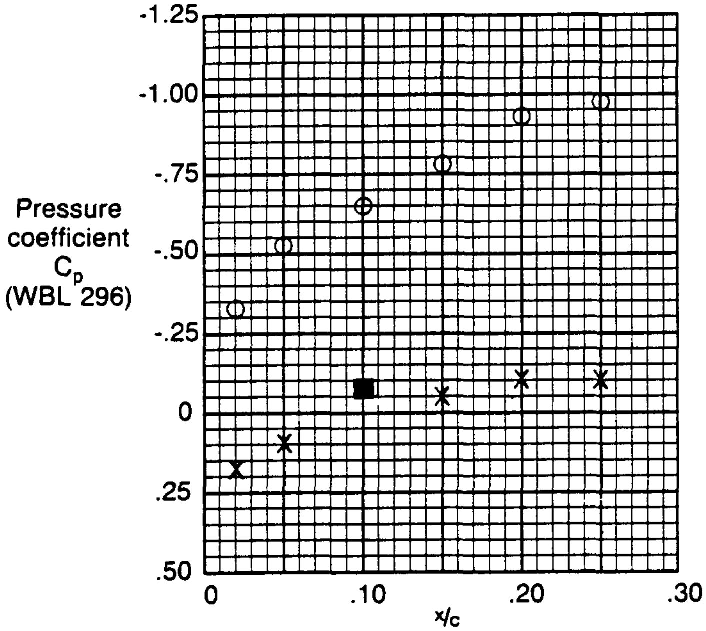
■ = Invalid data point—shown for documentation only

Data affected by cirrus clouds



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	10	5	52	8
2U	.050	50	5	224	40
3U	.075	99	7	305	75
4U	.100	197	6	458	111
5U	.125	336	17	606	137
6U	.15	376	32	546	124
7U	.20	389	117	510	81
8U	.25	114	46	275	55
9U	.30	43	33	55	4
10U	.35	21	18	28	2
Lower					
1L	.020	12	3	101	16
2L	.050	63	6	216	47
3L	.075	171	7	395	95
4L	.100	236	14	425	107
5L	.125	314	60	470	109
6L	.15	462	53	615	119
7L	.20	114	36	215	44
8L	.25	56	32	195	27
9L	.30	67	48	92	8
10L	.35	69	51	86	7

Figure 6-42. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.224



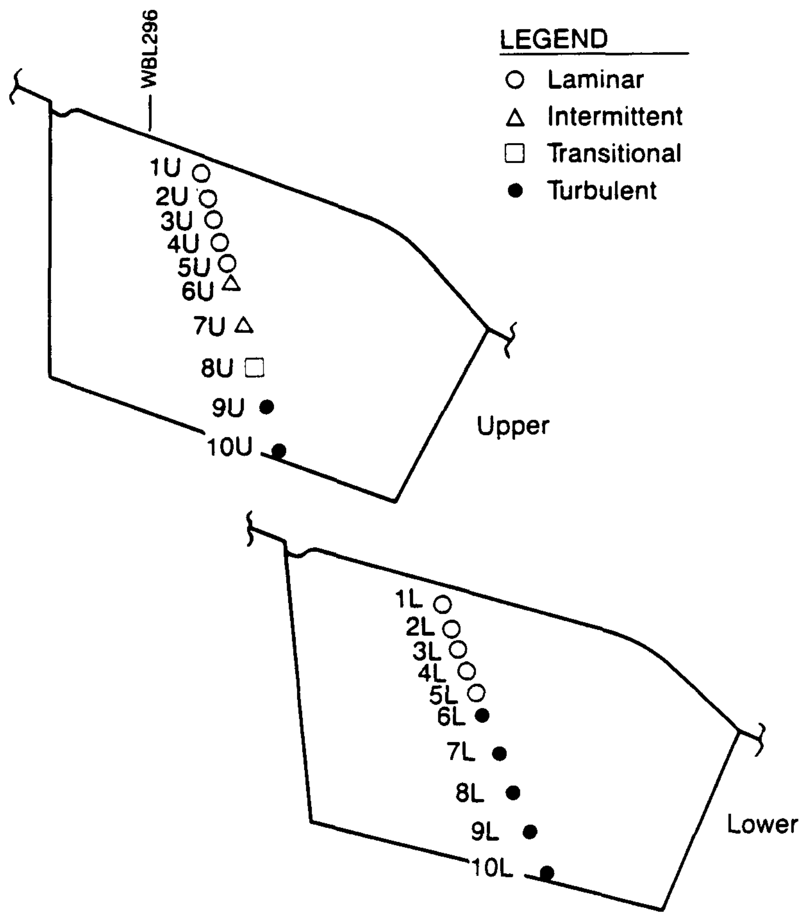
Mach No. = .800
Altitude = 40 483 ft
C_L = .537
β = -0.7 deg
α_B = 2.92 deg
$N_{1_{E2}}$ = 3437 r/min

NOTES:

Pressures adjusted by Δ Cp = +.208

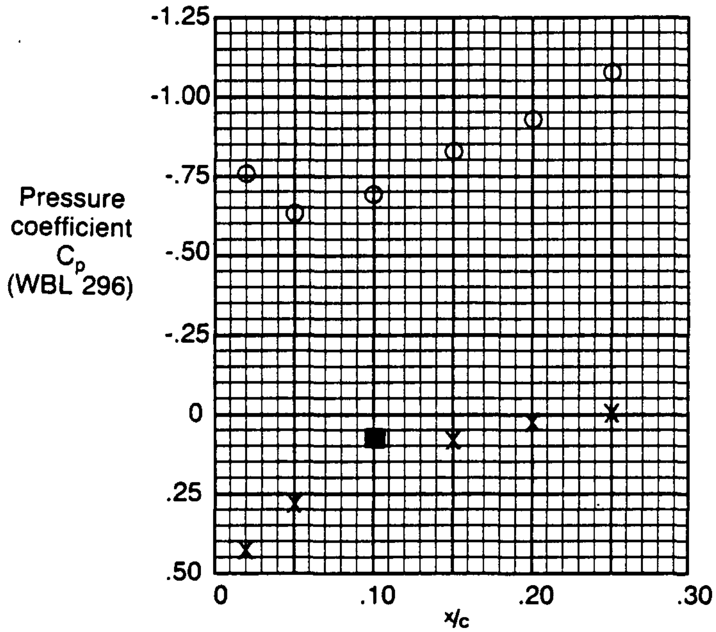
■ = Invalid data point—shown for documentation only

Data affected by cirrus during early part of test condition



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	5	0
2U	.050	5	5	36	3
3U	.075	8	7	79	5
4U	.100	6	5	113	9
5U	.125	8	4	142	12
6U	.15	13	4	279	36
7U	.20	43	8	304	63
8U	.25	46	33	293	30
9U	.30	38	32	46	3
10U	.35	21	17	27	2
Lower					
1L	.020	3	2	35	2
2L	.050	7	6	38	3
3L	.075	10	5	197	19
4L	.100	16	8	282	32
5L	.125	19	9	242	31
6L	.15	34	12	368	58
7L	.20	36	18	188	23
8L	.25	33	25	105	9
9L	.30	55	43	78	6
10L	.35	65	50	81	6

Figure 6-43. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.225

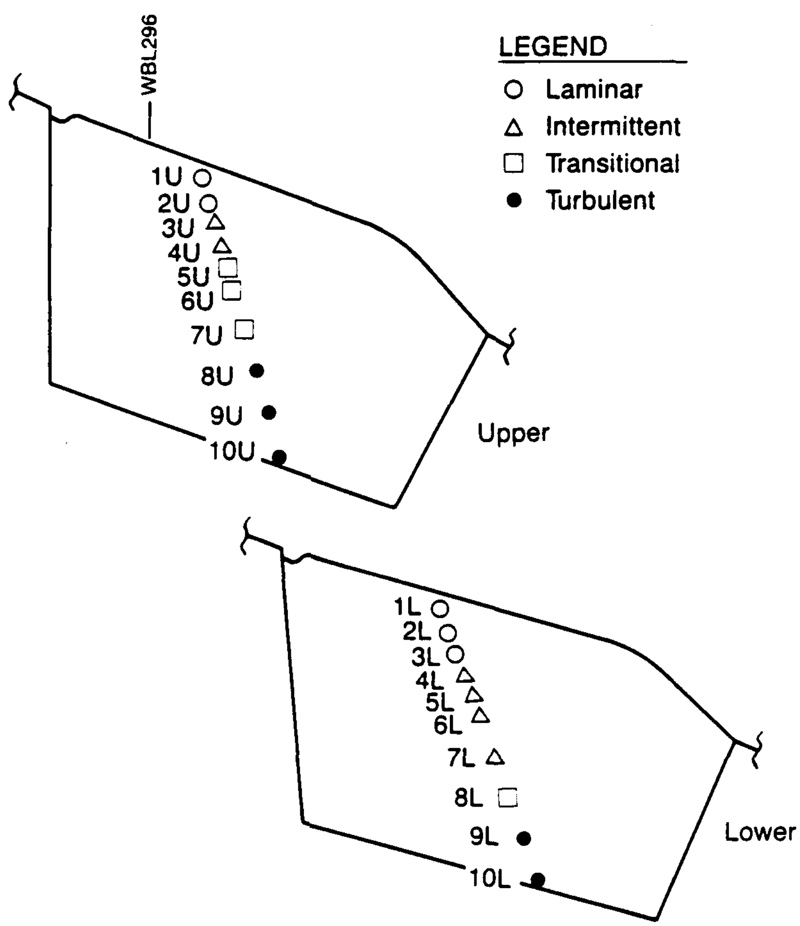


Mach No. = .792
Altitude = 40 426 ft
C_L = .545
β = + 4.8 deg
α_B = 3.54 deg
$N_{1_{E2}}$ = 3587 r/min

NOTES:

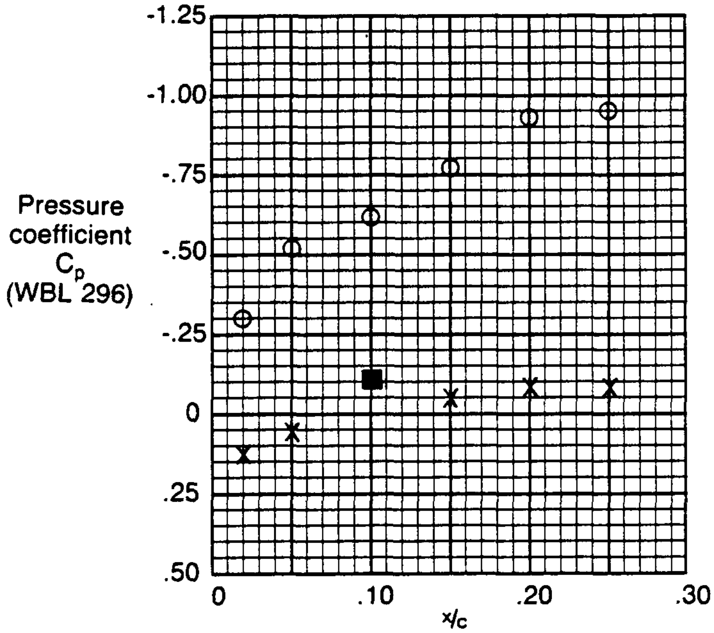
Pressures adjusted by Δ Cp = +.241

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	6	5	20	1
2U	.050	6	5	88	5
3U	.075	14	7	138	18
4U	.100	106	6	415	99
5U	.125	311	40	537	143
6U	.15	154	34	511	146
7U	.20	71	37	344	53
8U	.25	47	39	58	3
9U	.30	43	34	57	4
10U	.35	20	17	23	1
Lower					
1L	.020	2	2	13	1
2L	.050	7	6	48	3
3L	.075	8	5	208	17
4L	.100	14	7	294	28
5L	.125	19	8	296	37
6L	.15	26	9	364	53
7L	.20	25	8	220	35
8L	.25	154	32	346	61
9L	.30	53	37	163	10
10L	.35	60	49	88	5

Figure 6-44. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.226

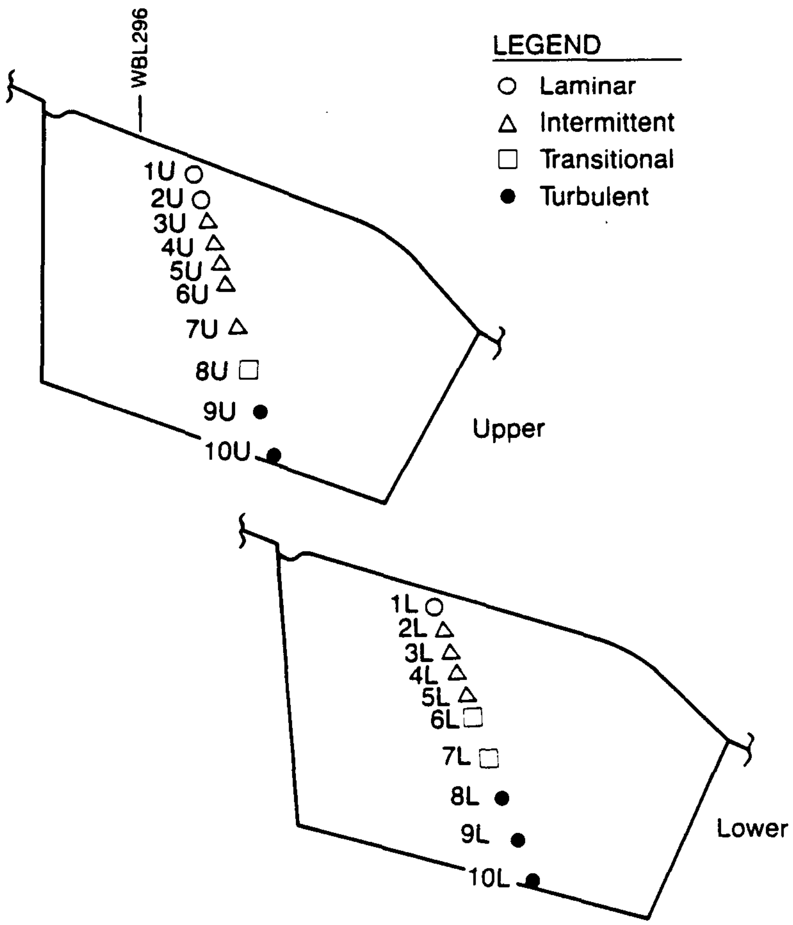


Mach No. = .797
Altitude = 40 449 ft
C_L = .537
β = -4.0 deg
α_B = 3.58 deg
N_{1E2} = 3615 r/min

NOTES:

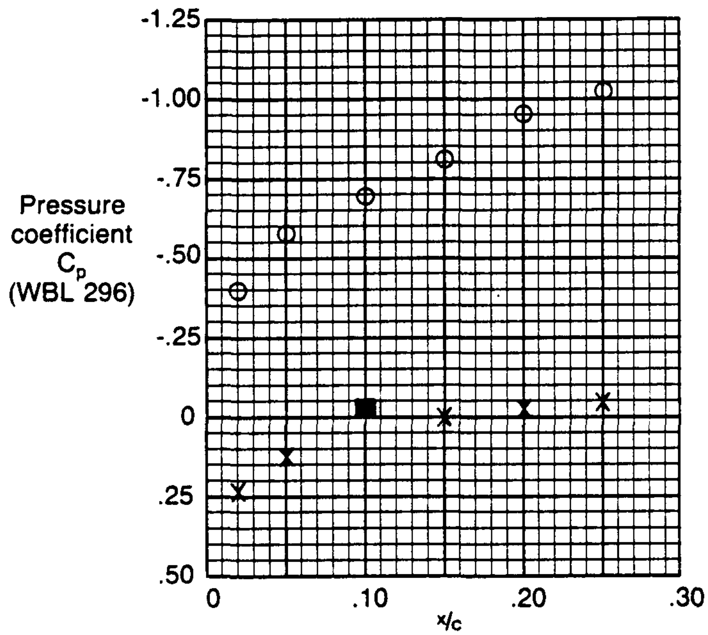
Pressures adjusted by Δ Cp = +.210

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	10	0
2U	.050	7	5	77	8
3U	.075	12	7	187	19
4U	.100	15	5	231	30
5U	.125	32	4	320	55
6U	.15	41	4	359	68
7U	.20	93	9	428	94
8U	.25	85	35	358	65
9U	.30	40	32	57	4
10U	.35	20	16	25	2
Lower					
1L	.020	3	2	42	3
2L	.050	14	6	121	18
3L	.075	39	6	330	61
4L	.100	62	8	335	75
5L	.125	106	11	389	96
6L	.15	446	271	562	56
7L	.20	41	18	147	27
8L	.25	36	28	87	6
9L	.30	59	44	88	6
10L	.35	68	55	85	6

Figure 6-45. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.227

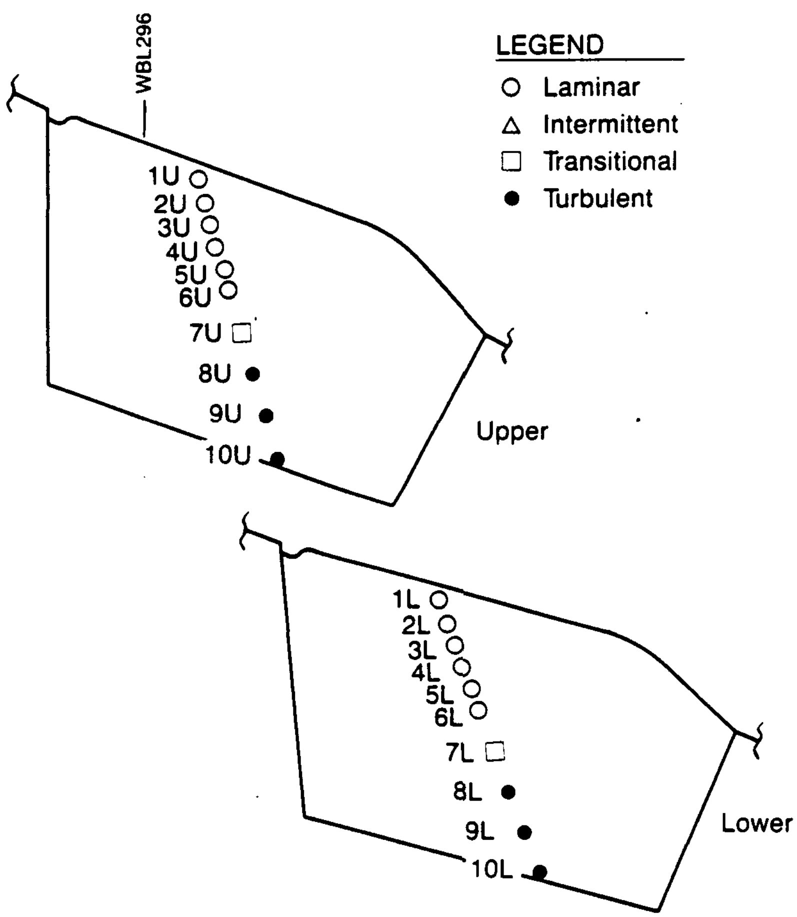


Mach No. = .790
Altitude = 41 295 ft
C_L = .567
β = -0.5 deg
α_B = 3.36 deg
$N_{1_{E2}}$ = 2384 r/min

NOTES:

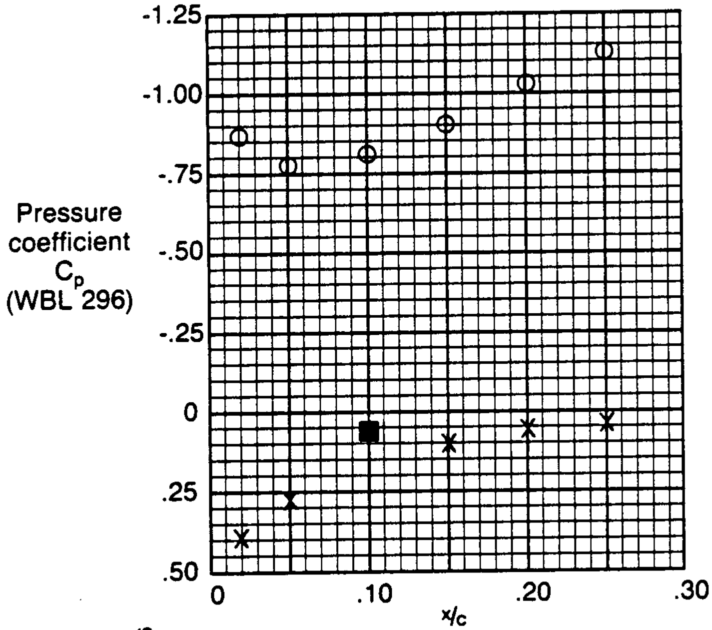
Pressures adjusted by Δ Cp = +.306

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	19	1
5U	.125	6	4	45	3
6U	.15	5	4	33	2
7U	.20	39	15	145	27
8U	.25	38	33	45	2
9U	.30	39	29	48	3
10U	.35	20	17	23	1
Lower					
1L	.020	2	2	2	0
2L	.050	6	5	6	0
3L	.075	3	3	4	1
4L	.100	6	5	6	0
5L	.125	5	4	7	1
6L	.15	6	5	6	1
7L	.20	161	98	224	22
8L	.25	29	26	35	2
9L	.30	52	41	69	5
10L	.35	63	49	74	6

Figure 6-46. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.228

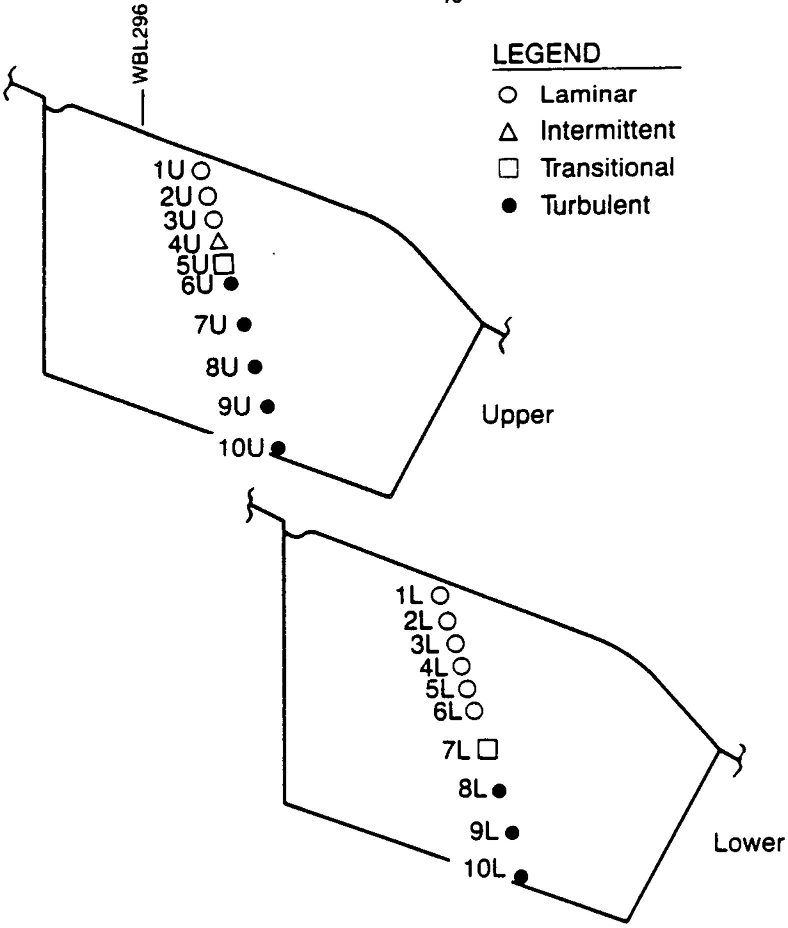


Mach No. = .754
Altitude = 40 793 ft
C_L = .606
β = -0.4 deg
α_B = 3.86 deg
$N_{1_{E2}}$ = 2994 r/min

NOTES:

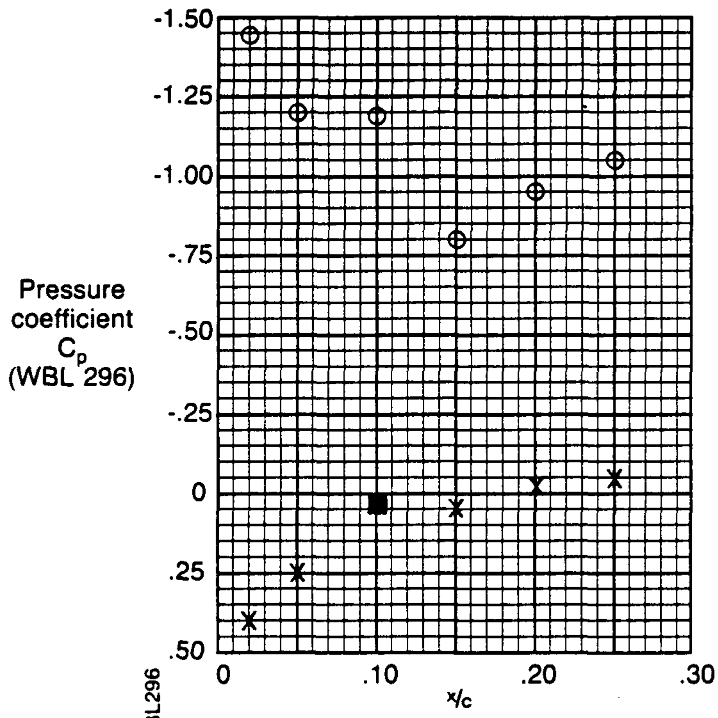
Pressures adjusted by Δ Cp = +.297

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	6	5	9	1
2U	.050	6	5	7	0
3U	.075	8	7	27	1
4U	.100	60	5	351	91
5U	.125	120	29	443	118
6U	.15	38	30	64	6
7U	.20	49	41	60	4
8U	.25	52	43	65	3
9U	.30	48	38	59	4
10U	.35	26	19	43	5
Lower					
1L	.020	2	2	2	0
2L	.050	6	5	6	0
3L	.075	4	3	6	1
4L	.100	7	6	8	1
5L	.125	7	4	81	5
6L	.15	15	9	73	6
7L	.20	57	18	144	28
8L	.25	31	25	58	3
9L	.30	55	44	69	5
10L	.35	64	52	86	6

Figure 6-47. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.229

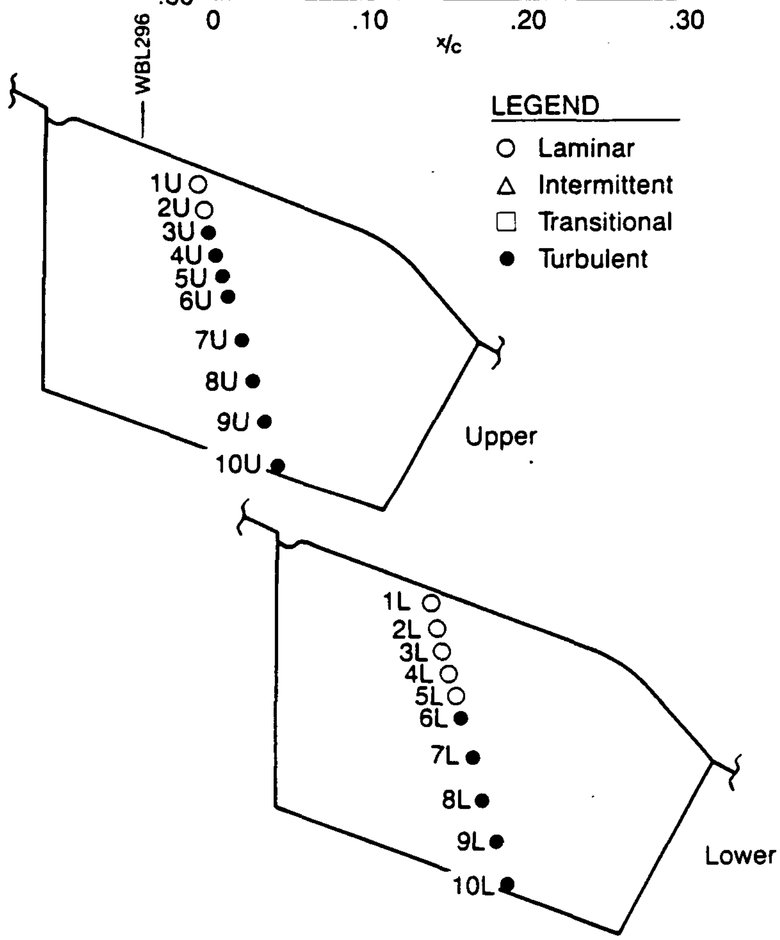


Mach No. = .701
Altitude = 39 015 ft
C_L = .641
β = +0.7 deg
α_B = 4.58 deg
$N_{1_{E2}}$ = 4059 r/min

NOTES:

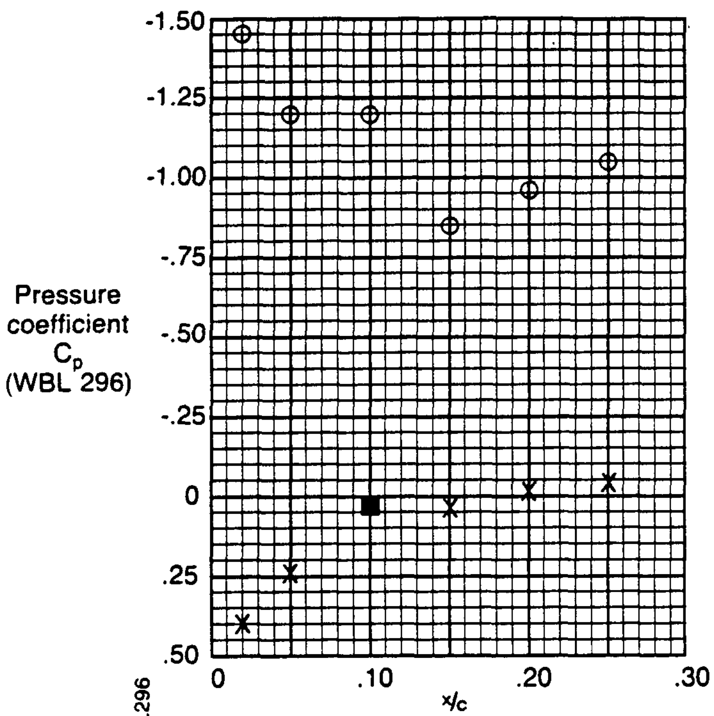
Pressures adjusted by Δ Cp = -.098

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	1
3U	.075	38	32	55	3
4U	.100	33	28	39	2
5U	.125	48	37	59	5
6U	.15	46	37	59	4
7U	.20	54	44	66	4
8U	.25	58	47	70	4
9U	.30	62	48	76	5
10U	.35	33	26	42	3
Lower					
1L	.020	3	2	3	0
2L	.050	7	6	7	0
3L	.075	7	6	8	1
4L	.100	10	8	15	1
5L	.125	13	10	19	1
6L	.15	33	20	122	16
7L	.20	20	17	26	1
8L	.25	32	26	38	2
9L	.30	58	45	79	5
10L	.35	67	51	85	6

Figure 6-48. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.231

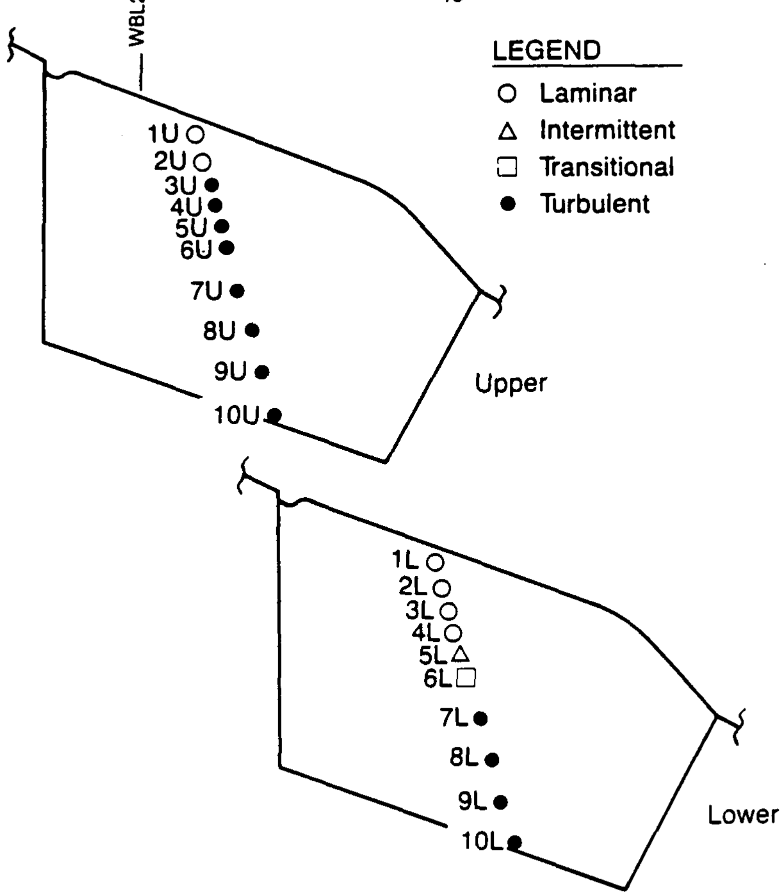


Mach No.	=	.697
Altitude	=	39 009 ft
C_L	=	.647
β	=	0.0 deg
α_B	=	4.59 deg
$N_{1_{E2}}$	=	3618 r/min

NOTES:

Pressures adjusted by Δ Cp = -.093

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	1
3U	.075	34	28	43	2
4U	.100	34	29	40	2
5U	.125	47	38	59	4
6U	.15	45	36	60	4
7U	.20	54	46	65	4
8U	.25	57	48	71	4
9U	.30	69	55	91	6
10U	.35	33	27	43	3
Lower					
1L	.020	2	2	3	1
2L	.050	7	6	7	1
3L	.075	6	5	8	1
4L	.100	11	10	18	2
5L	.125	31	12	132	24
6L	.15	311	196	414	45
7L	.20	20	17	26	1
8L	.25	33	27	41	2
9L	.30	60	45	77	6
10L	.35	67	54	92	6

Figure 6-49. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.232

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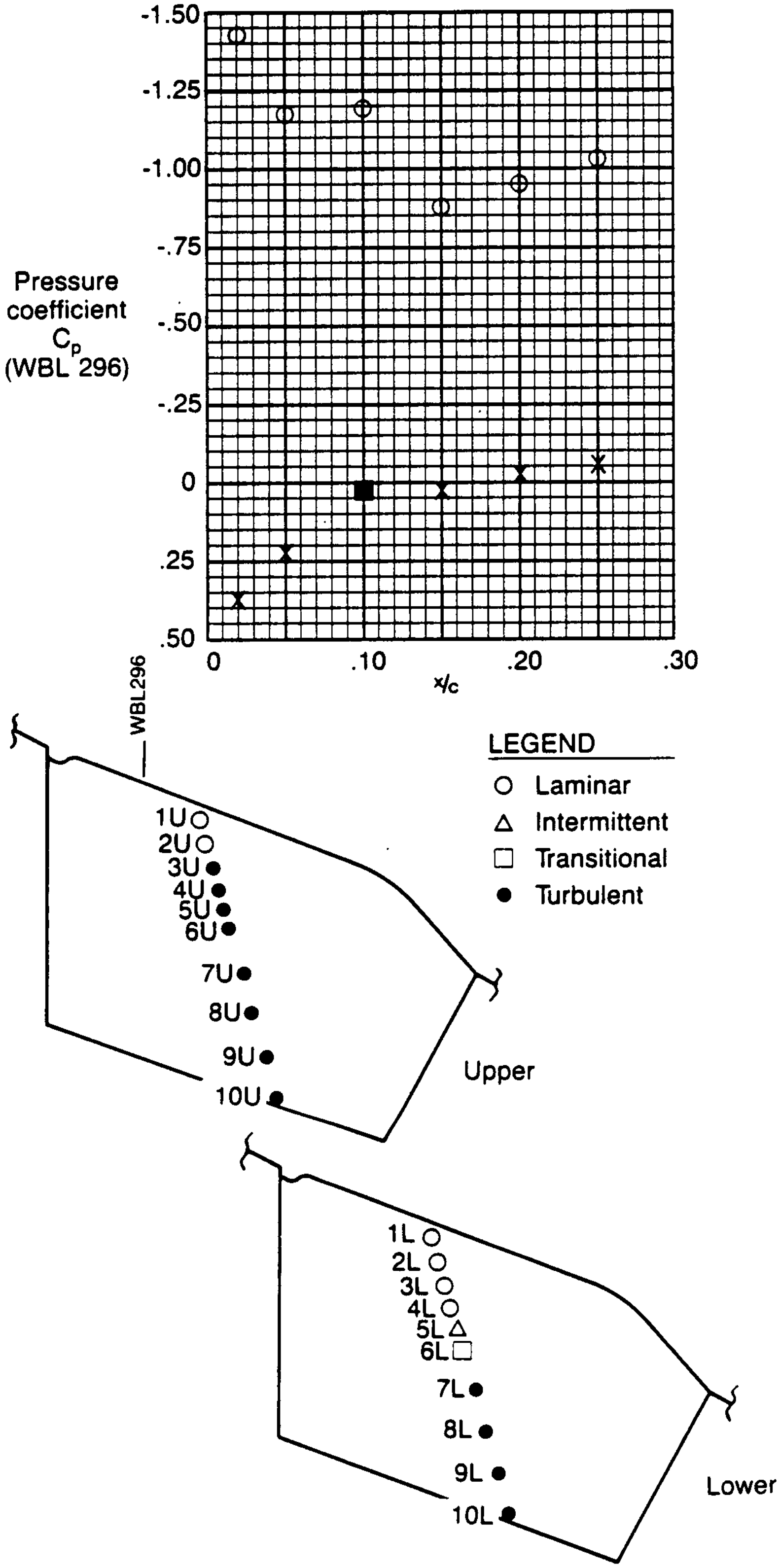


Mach No. = .697
Altitude = 39 005 ft
C_L = .645
β = -0.3 deg
α_B = 4.65 deg
$N_{1_{E2}}$ = 3259 r/min

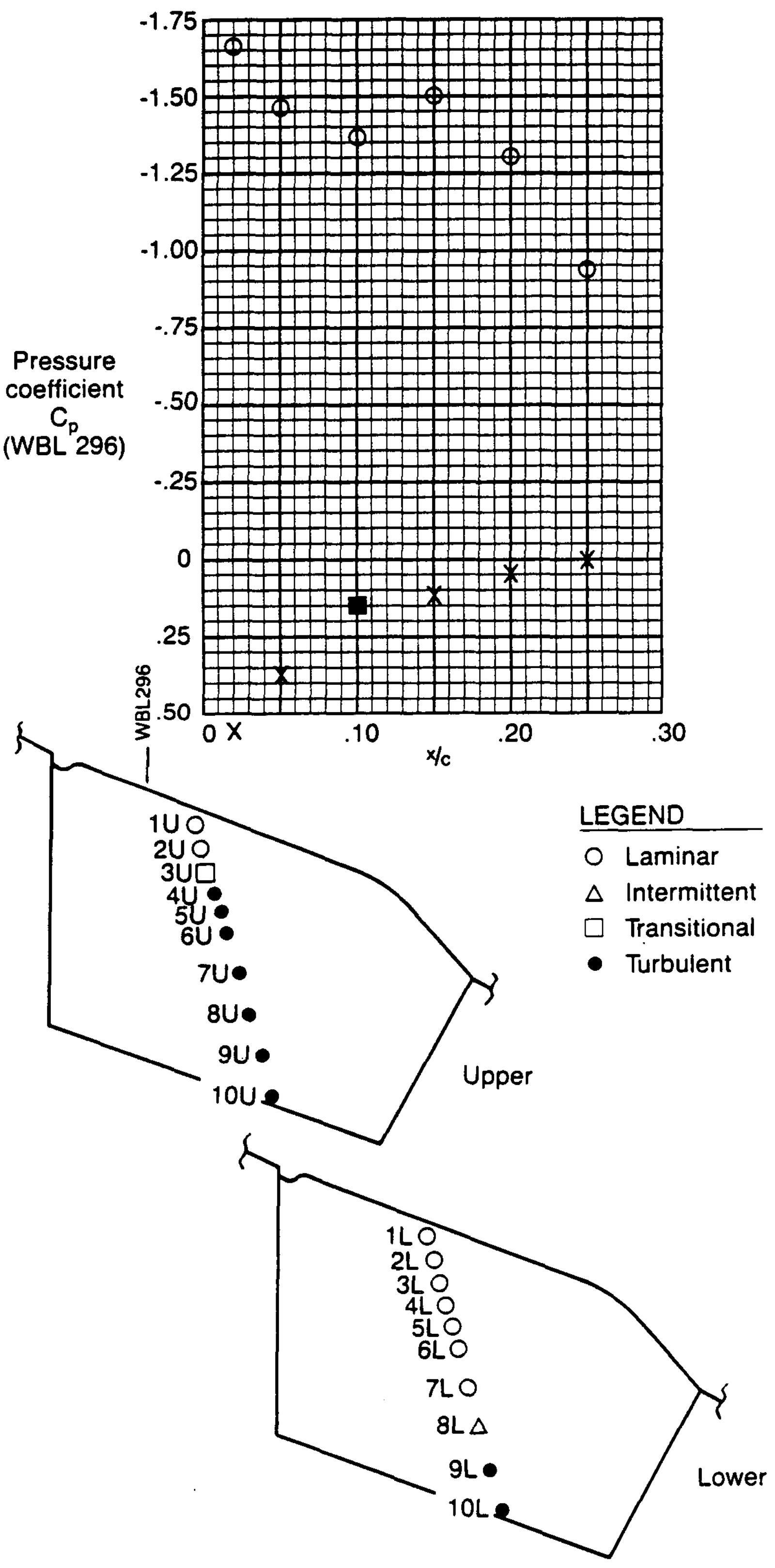
NOTES:

Pressures adjusted by Δ Cp = -.095

■ = Invalid data point—shown for documentation only

Hot film no.	$\frac{x}{c}$	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	1
3U	.075	33	27	41	2
4U	.100	34	29	41	2
5U	.125	46	37	57	4
6U	.15	45	36	59	4
7U	.20	54	45	64	4
8U	.25	58	48	68	4
9U	.30	68	54	89	6
10U	.35	33	27	45	3
Lower					
1L	.020	2	2	3	0
2L	.050	6	5	6	0
3L	.075	4	3	6	1
4L	.100	12	8	17	2
5L	.125	34	11	162	31
6L	.15	184	15	323	93
7L	.20	19	16	25	1
8L	.25	32	27	40	2
9L	.30	60	47	82	6
10L	.35	66	52	89	6

Figure 6-50. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.233



Mach No. = .699
Altitude = 39 042 ft
C_L = .644
β = +6.8 deg
α_B = 5.30 deg
$N_{1_{E2}}$ = 3412 r/min

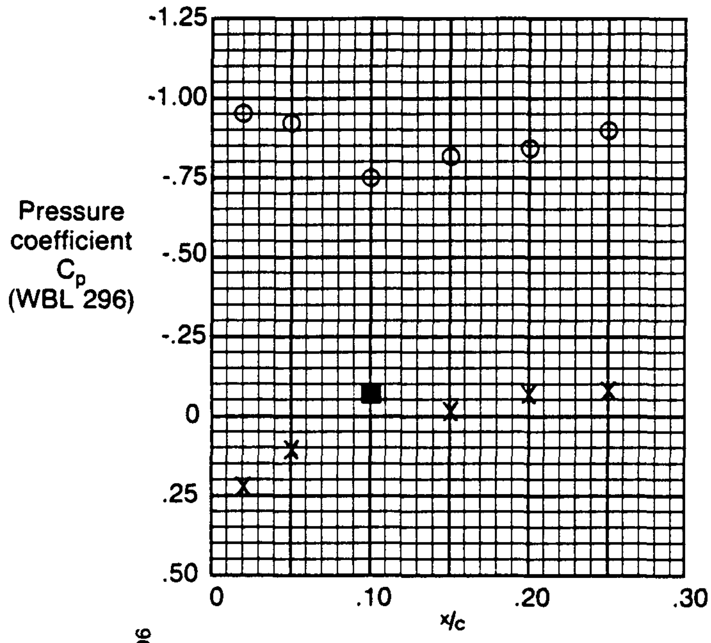
NOTES:

Pressures adjusted by Δ Cp = -.095

■ = Invalid data point—shown for documentation only

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	0
3U	.075	199	146	315	34
4U	.100	30	26	36	2
5U	.125	36	30	46	3
6U	.15	38	32	63	4
7U	.20	56	46	69	5
8U	.25	59	49	75	4
9U	.30	56	45	67	5
10U	.35	41	31	53	4
Lower					
1L	.020	2	2	2	0
2L	.050	6	5	6	0
3L	.075	3	3	4	1
4L	.100	6	5	6	0
5L	.125	5	4	6	1
6L	.15	6	5	6	1
7L	.20	6	5	7	0
8L	.25	12	7	202	27
9L	.30	44	34	56	4
10L	.35	56	45	70	5

Figure 6-51. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.234

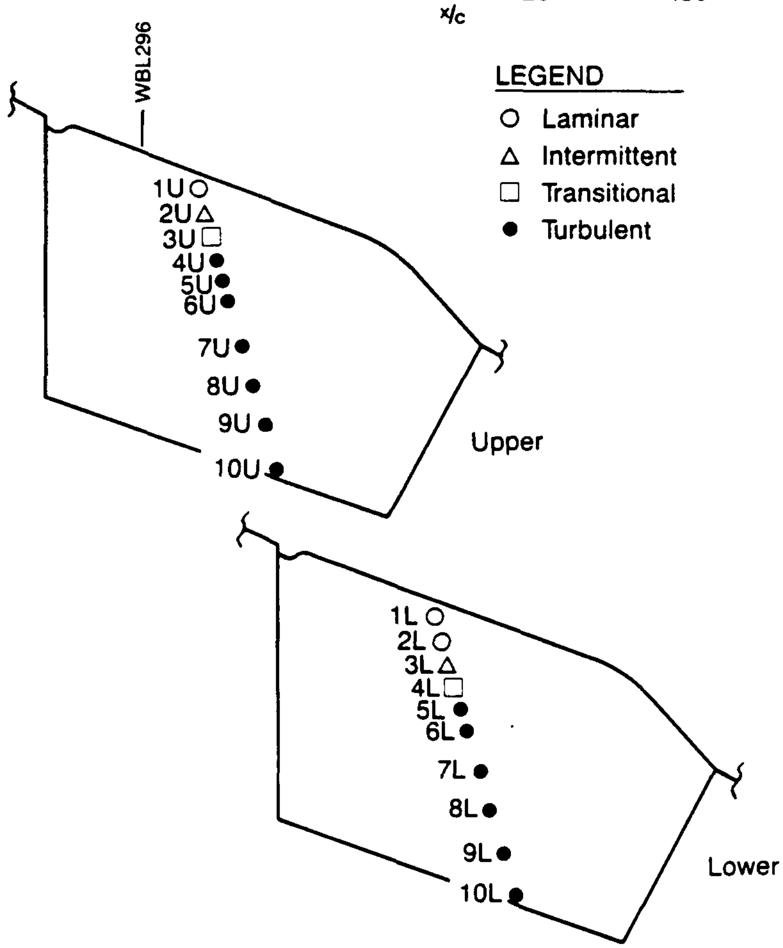


Mach No. = .708
Altitude = 38 954 ft
C_L = .623
β = -6.7 deg
α_B = 5.55 deg
$N_{1_{E2}}$ = 3441 r/min

NOTES:

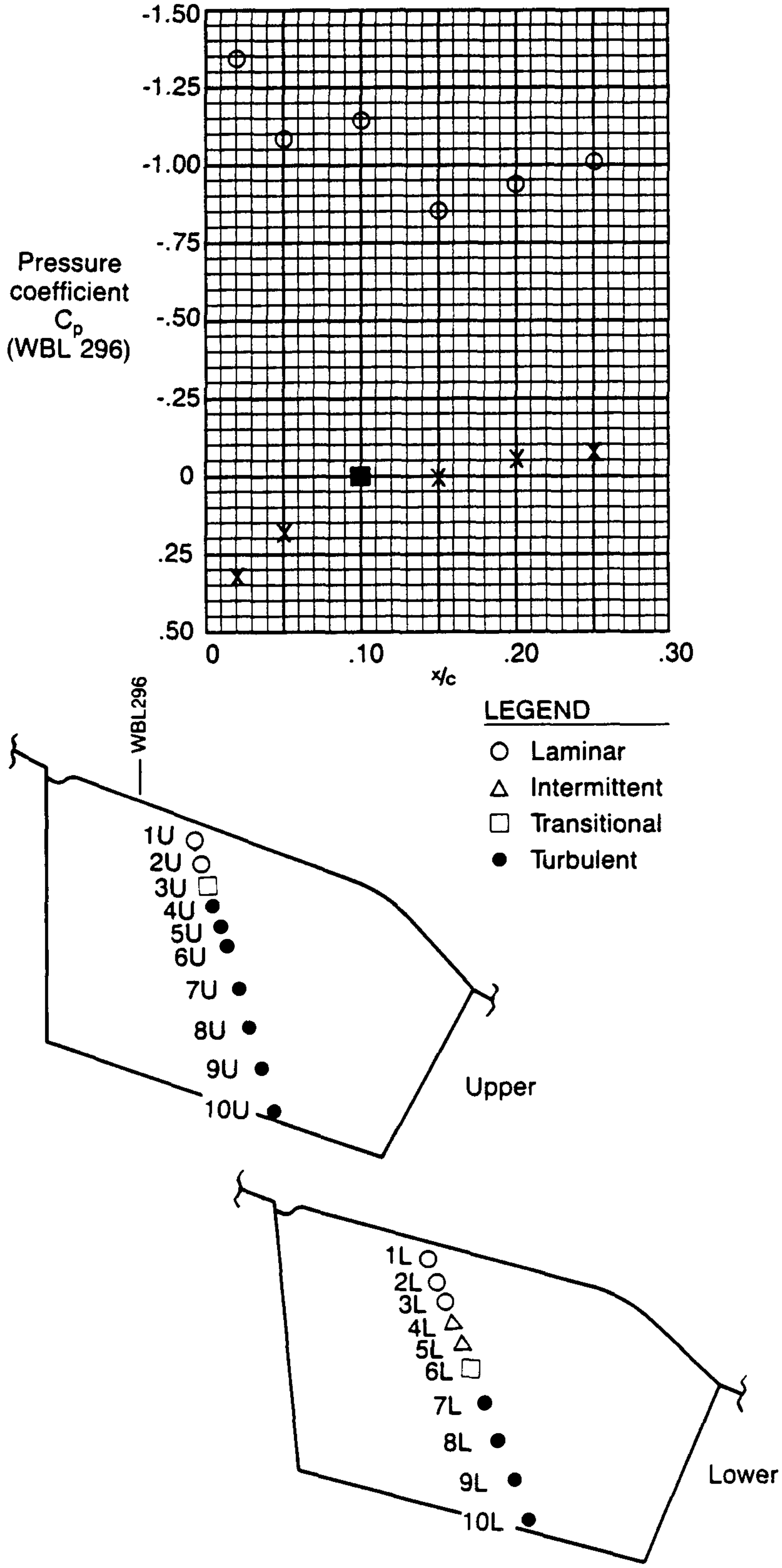
Pressures adjusted by Δ Cp = -.095

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	6	0
2U	.050	16	6	27	5
3U	.075	38	26	222	32
4U	.100	35	29	40	2
5U	.125	43	36	57	4
6U	.15	44	37	55	3
7U	.20	55	46	68	4
8U	.25	63	54	82	5
9U	.30	65	50	81	6
10U	.35	34	27	42	3
Lower					
1L	.020	3	2	4	1
2L	.050	8	6	12	1
3L	.075	53	6	344	58
4L	.100	91	14	234	54
5L	.125	31	23	49	3
6L	.15	39	30	52	4
7L	.20	23	19	28	2
8L	.25	38	32	47	3
9L	.30	66	51	86	7
10L	.35	73	59	94	6

Figure 6-52. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.235



Mach No.	=	.705
Altitude	=	38 920 ft
C_L	=	.627
β	=	-0.8 deg
α_B	=	4.47 deg
$N_{1_{E2}}$	=	2349 r/min

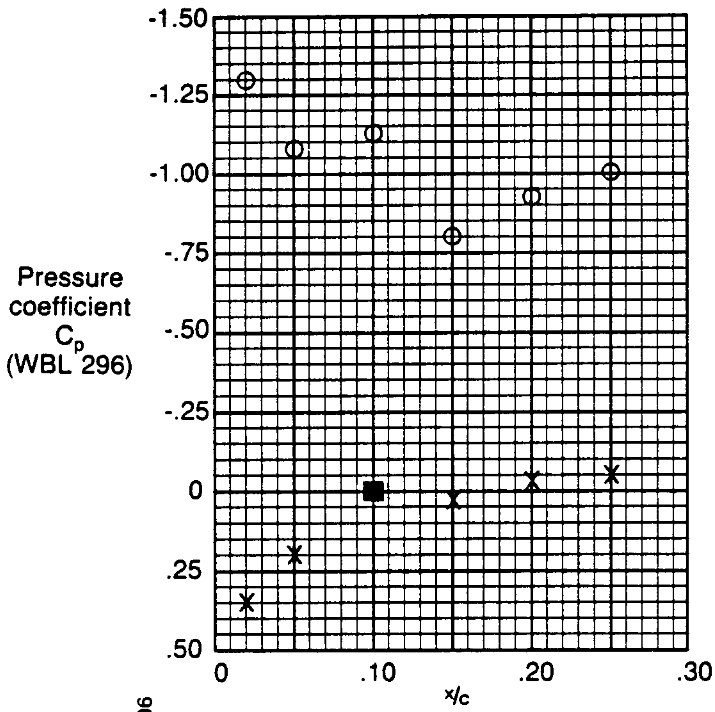
NOTES:

Pressures adjusted by Δ Cp = -.106

■ = Invalid data point—shown for documentation only

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
		Upper			
1U	.020	5	5	6	0
2U	.050	6	5	7	1
3U	.075	89	31	253	57
4U	.100	33	28	42	2
5U	.125	43	32	58	4
6U	.15	44	35	52	3
7U	.20	54	45	62	3
8U	.25	57	48	70	4
9U	.30	68	47	90	7
10U	.35	33	27	41	3
		Lower			
1L	.020	2	1	2	0
2L	.050	6	5	10	1
3L	.075	5	3	11	2
4L	.100	13	6	31	5
5L	.125	13	4	48	9
6L	.15	91	24	502	110
7L	.20	18	15	24	2
8L	.25	31	26	37	2
9L	.30	58	44	72	6
10L	.35	67	54	84	6

Figure 6-53. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.236

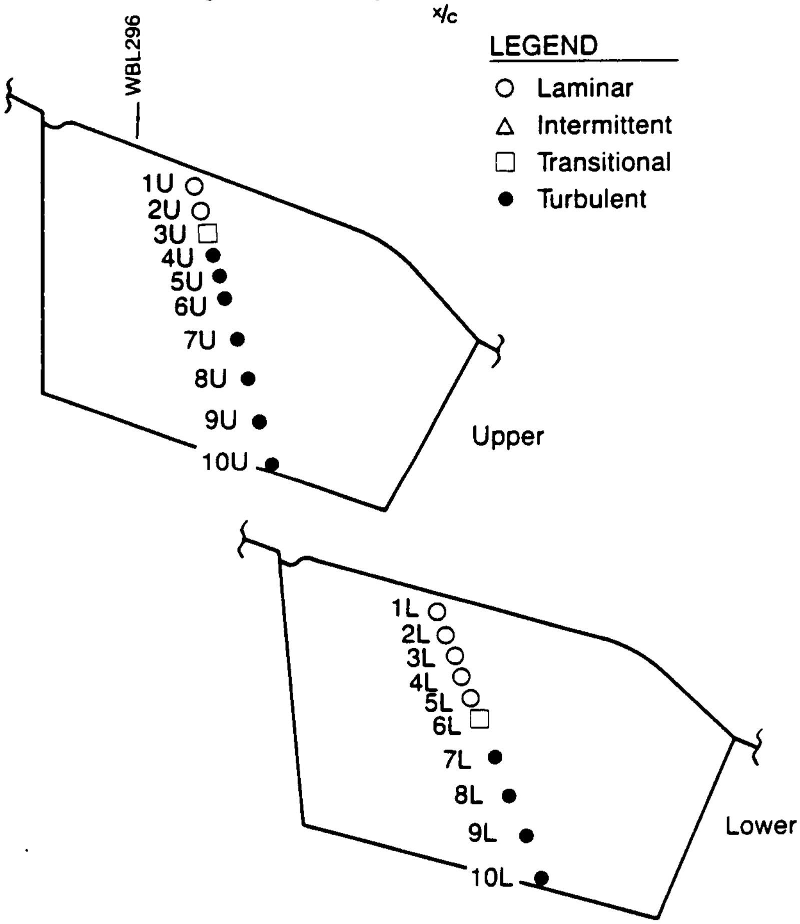


Mach No.	=	.707
Altitude	=	39 005 ft
C_L	=	.623
β	=	-0.5 deg
α_B	=	4.39 deg
$N_{1_{E2}}$	=	2962 r/min

NOTES:

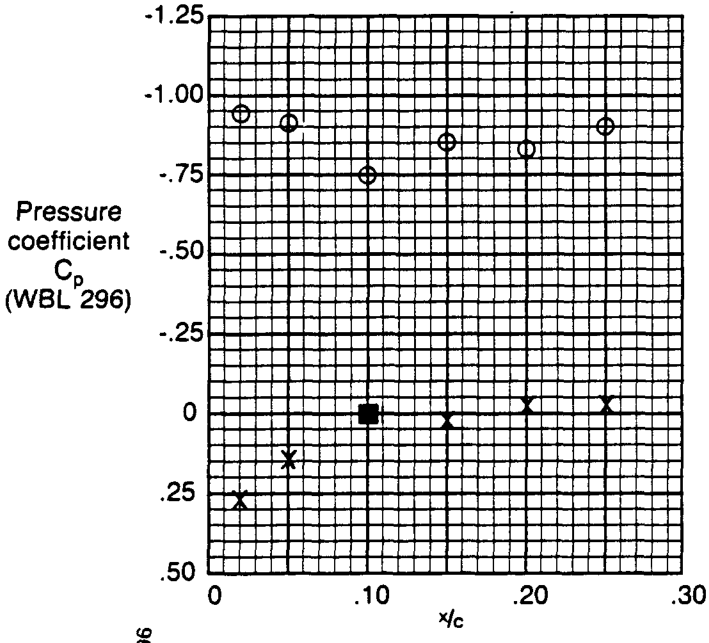
Pressures adjusted by Δ Cp = -.087

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	6	1
3U	.075	87	31	234	53
4U	.100	32	28	38	2
5U	.125	48	38	61	5
6U	.15	44	33	55	3
7U	.20	54	46	67	4
8U	.25	58	49	69	4
9U	.30	67	49	87	8
10U	.35	33	26	42	3
Lower					
1L	.020	2	2	2	0
2L	.050	6	5	7	0
3L	.075	4	3	6	1
4L	.100	9	6	13	2
5L	.125	8	6	18	3
6L	.15	51	11	318	66
7L	.20	17	14	21	1
8L	.25	30	25	37	2
9L	.30	57	44	76	6
10L	.35	66	53	84	6

Figure 6-54. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.237

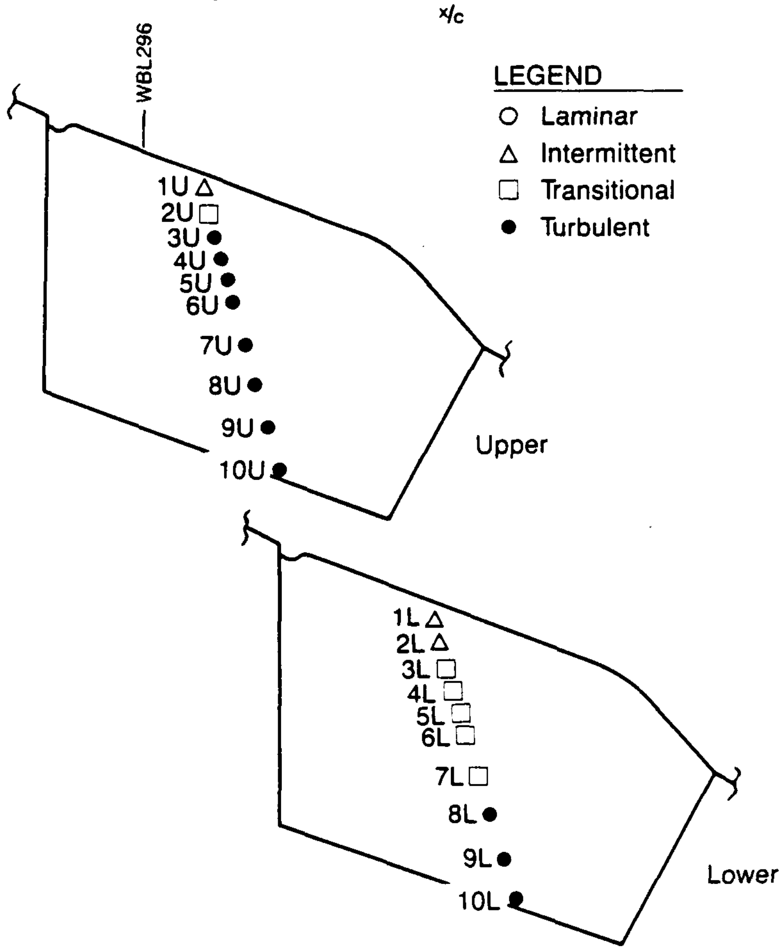


Mach No. = .694
Altitude = 36 497 ft
C_L = .555
β = -0.7 deg
α_B = 4.03 deg
$N_{1_{E2}}$ = 1001 r/min

NOTES:

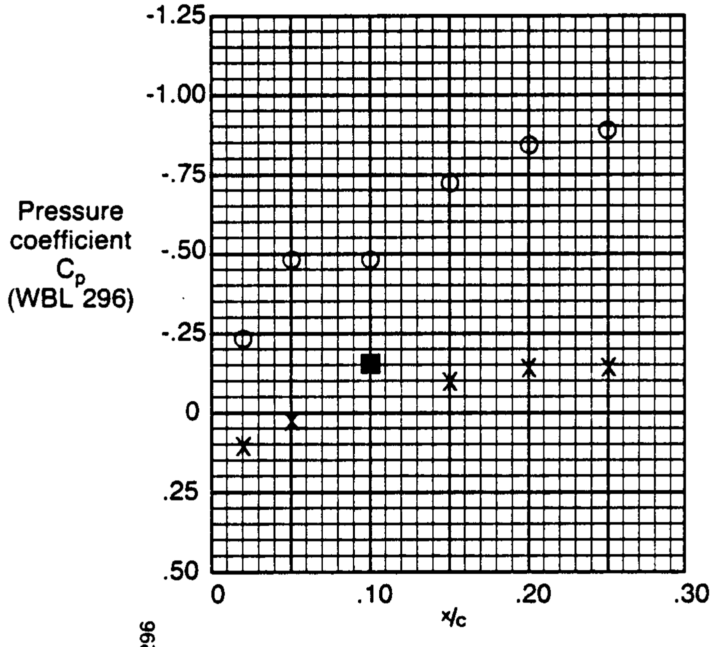
Pressures adjusted by Δ Cp = -.377

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	26	6	286	41
2U	.050	246	20	526	134
3U	.075	36	25	154	15
4U	.100	37	29	48	3
5U	.125	44	35	56	4
6U	.15	46	37	61	4
7U	.20	56	45	68	4
8U	.25	64	53	79	5
9U	.30	65	48	87	6
10U	.35	35	26	45	3
Lower					
1L	.020	16	3	295	35
2L	.050	20	6	317	33
3L	.075	40	9	306	44
4L	.100	58	14	332	57
5L	.125	198	38	468	102
6L	.15	354	32	676	151
7L	.20	116	21	265	61
8L	.25	37	28	146	8
9L	.30	60	44	78	6
10L	.35	67	52	85	6

Figure 6-55. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.238

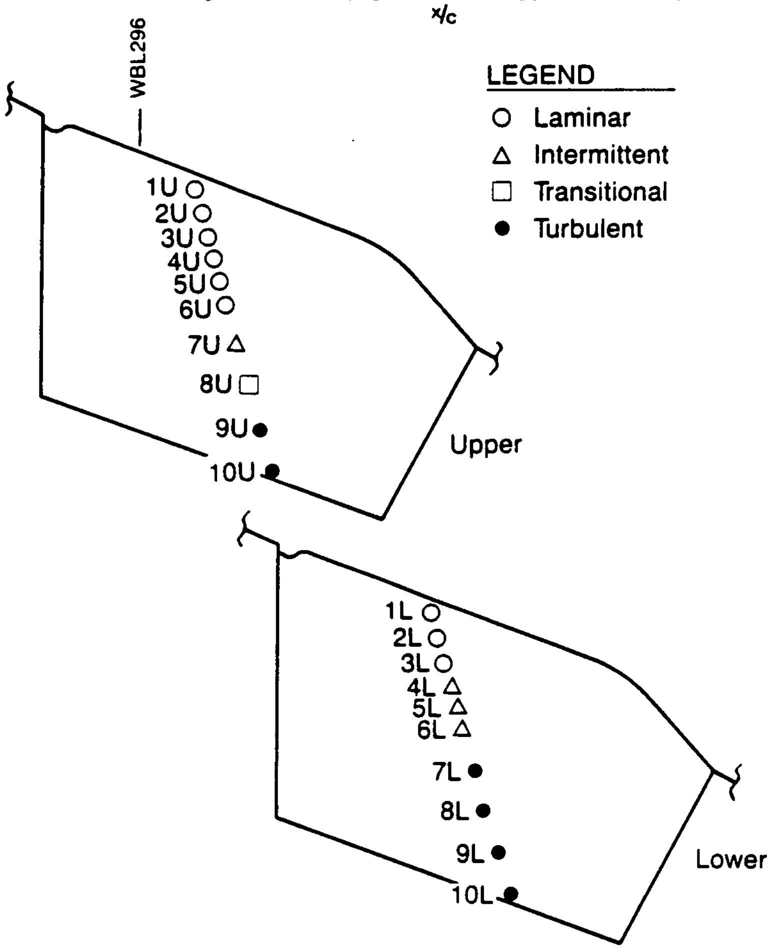


Mach No.	=	.802
Altitude	=	37 999 ft
C_L	=	.460
β	=	-0.5 deg
α_B	=	2.41 deg
$N_{1_{E2}}$	=	3271 r/min

NOTES:

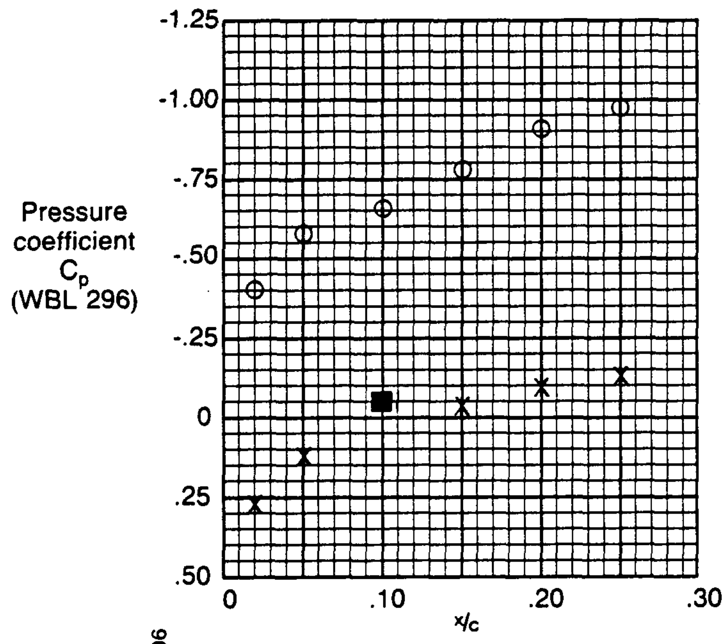
Pressures adjusted by Δ Cp = -.107

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	1
3U	.075	8	7	102	5
4U	.100	7	5	306	18
5U	.125	8	4	323	20
6U	.15	7	5	202	14
7U	.20	21	8	362	44
8U	.25	154	42	418	68
9U	.30	37	27	63	5
10U	.35	20	17	25	1
Lower					
1L	.020	3	2	4	0
2L	.050	6	6	17	1
3L	.075	7	5	166	12
4L	.100	12	7	175	20
5L	.125	17	9	285	31
6L	.15	29	11	381	52
7L	.20	22	15	158	14
8L	.25	32	25	59	3
9L	.30	55	44	78	6
10L	.35	64	50	80	6

Figure 6-56. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.239

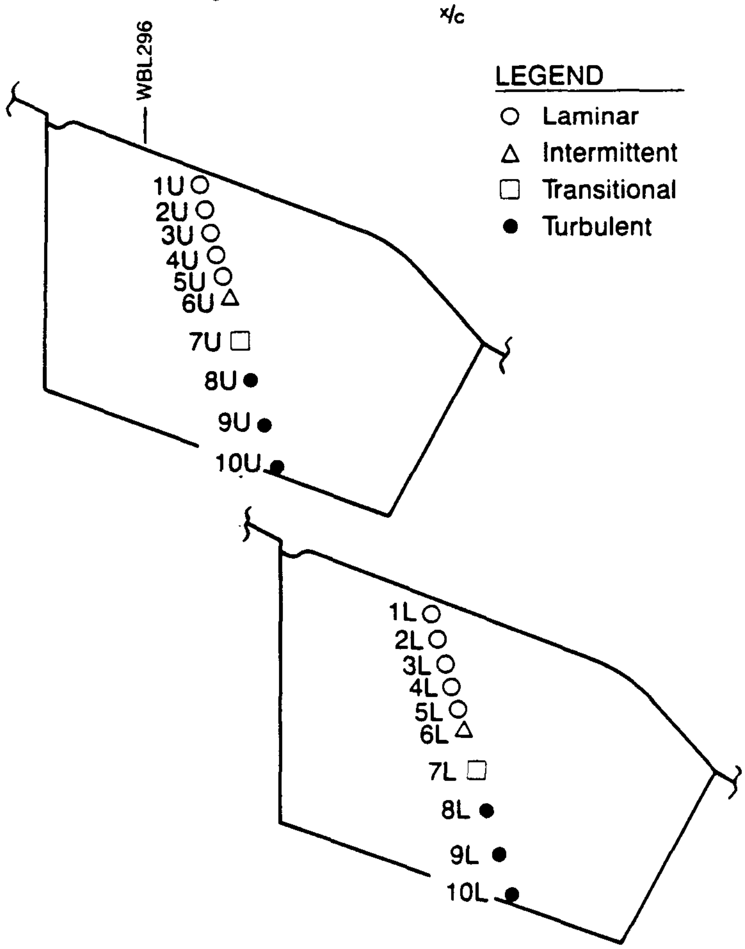


Mach No. = .798
Altitude = 38 003 ft
C_L = .464
β = +3.9 deg
α_B = 2.84 deg
$N_{1_{E2}}$ = 3377 r/min

NOTES:

Pressures adjusted by Δ Cp = -.107

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	5	5	33	2
3U	.075	9	7	85	6
4U	.100	7	5	124	12
5U	.125	15	4	287	39
6U	.15	30	4	344	62
7U	.20	128	36	416	104
8U	.25	44	35	137	10
9U	.30	40	32	48	3
10U	.35	21	18	27	2
Lower					
1L	.020	3	2	4	0
2L	.050	6	6	17	1
3L	.075	6	4	126	8
4L	.100	10	7	168	15
5L	.125	13	8	153	16
6L	.15	18	10	356	35
7L	.20	146	57	248	40
8L	.25	31	25	183	11
9L	.30	51	41	71	5
10L	.35	61	49	76	5

Figure 6-57. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.240

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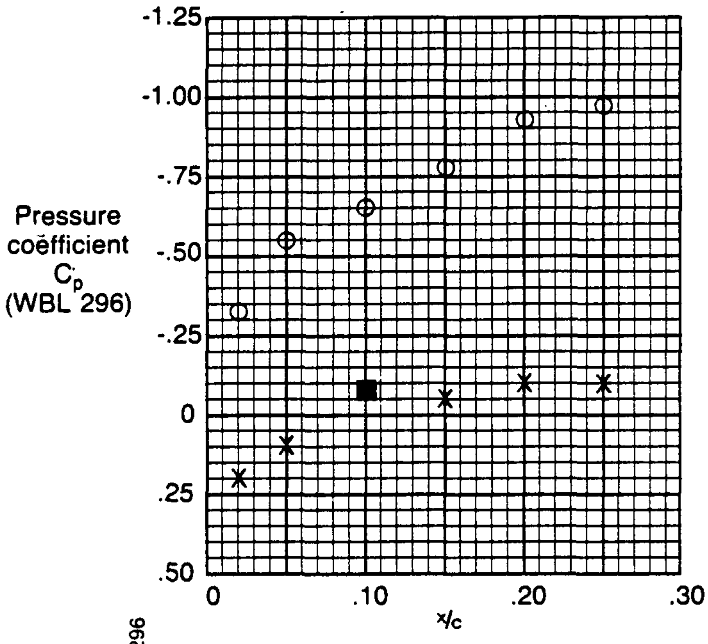
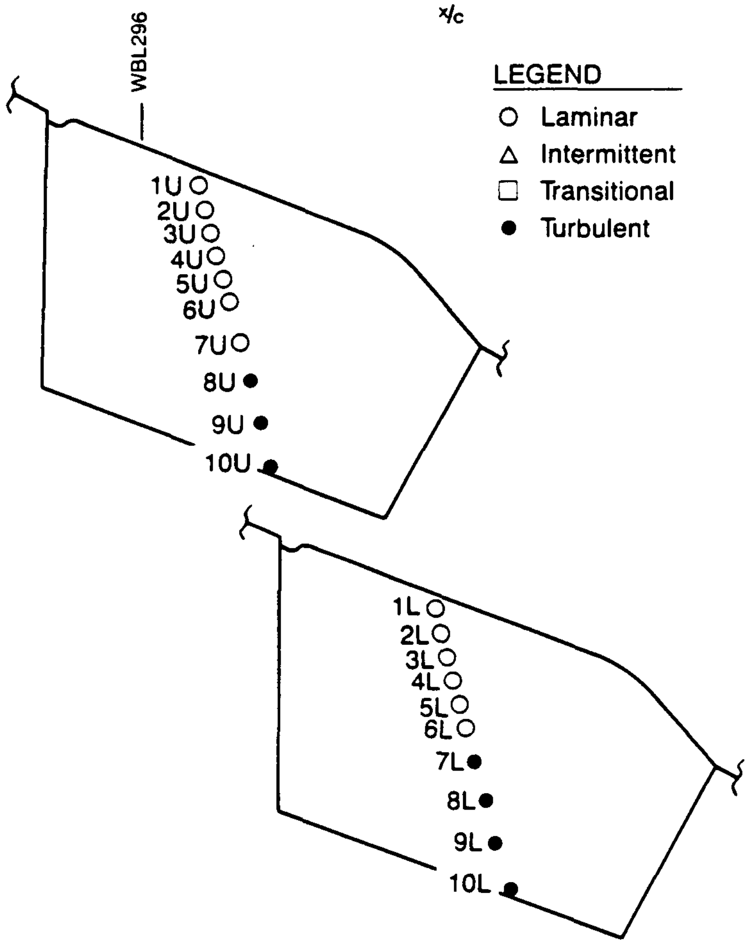


Mach No. = .802
Altitude = 40 971 ft
C_L = .527
β = 0.0 deg
α_B = 2.92 deg
$N_{1_{E2}}$ = 3653 r/min

NOTES:

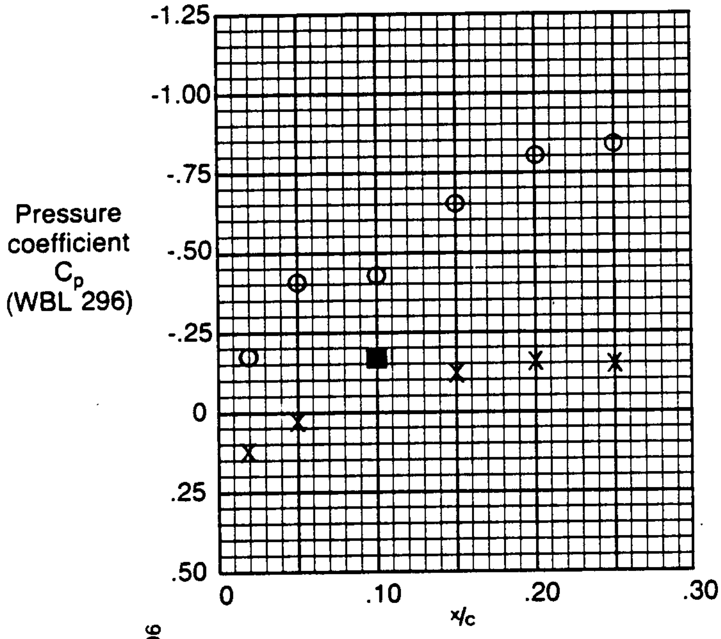
Pressures adjusted by Δ Cp = +.225

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	1
3U	.075	8	7	9	1
4U	.100	5	5	6	0
5U	.125	6	4	7	1
6U	.15	4	4	5	0
7U	.20	11	8	233	17
8U	.25	36	30	159	8
9U	.30	39	31	50	3
10U	.35	21	17	26	2
Lower					
1L	.020	3	3	4	0
2L	.050	6	6	7	0
3L	.075	6	5	8	1
4L	.100	9	8	10	0
5L	.125	12	10	14	1
6L	.15	14	12	16	1
7L	.20	32	17	90	12
8L	.25	30	26	38	2
9L	.30	54	43	74	5
10L	.35	63	49	89	6

Figure 6-58. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.241

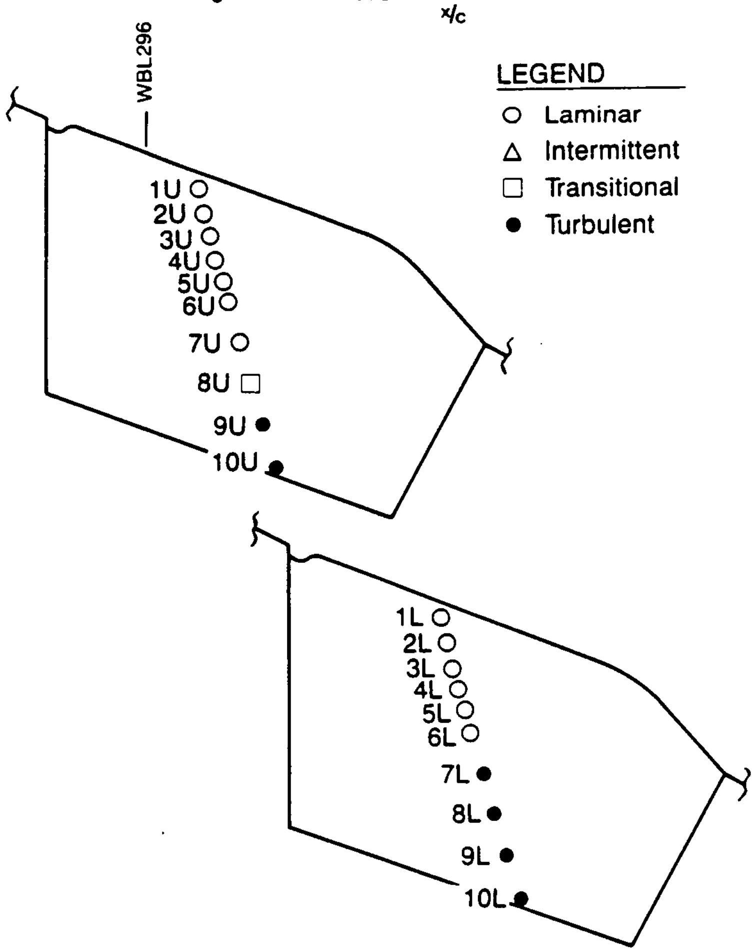


Mach No.	= .830
Altitude	= 40 968 ft
C_L	= .488
β	= +0.3 deg
α_B	= 2.45 deg
$N_{1_{E2}}$	= 3930 r/min

NOTES:

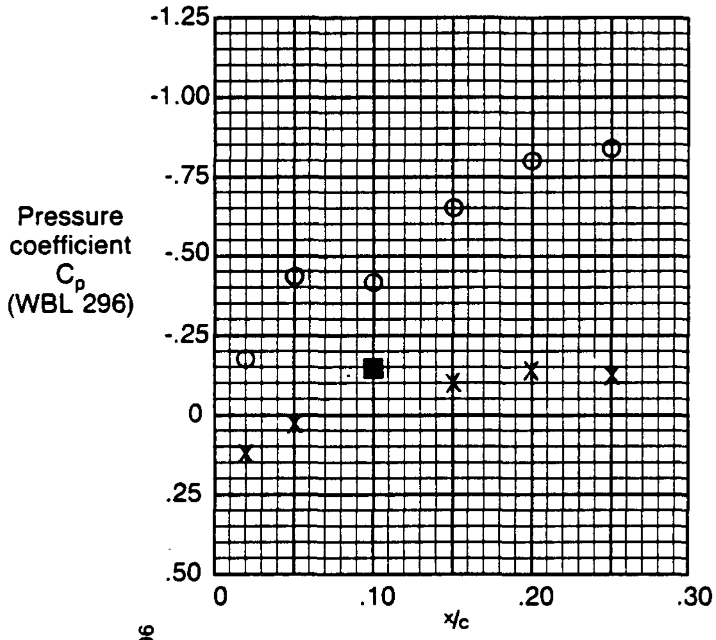
Pressures adjusted by Δ Cp = +.197

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	6	0
5U	.125	6	4	7	1
6U	.15	4	4	5	0
7U	.20	9	8	9	0
8U	.25	277	202	357	27
9U	.30	34	27	43	3
10U	.35	19	16	23	1
Lower					
1L	.020	4	3	4	1
2L	.050	7	6	7	0
3L	.075	9	7	11	1
4L	.100	12	11	14	1
5L	.125	16	13	20	1
6L	.15	19	15	24	1
7L	.20	19	16	29	1
8L	.25	30	25	37	2
9L	.30	55	41	72	5
10L	.35	64	52	85	5

Figure 6-59. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.242

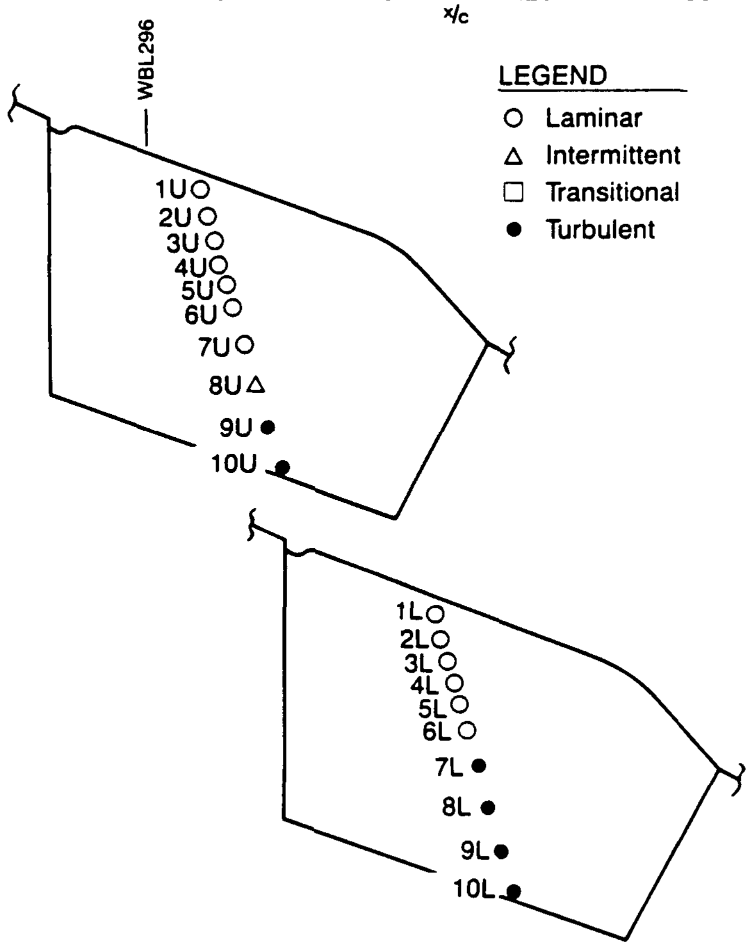


Mach No. = .816
Altitude = 38 976 ft
C_L = .457
β = +0.2 deg
α_B = 2.25 deg
$N_{1_{E2}}$ = 3985 r/min

NOTES:

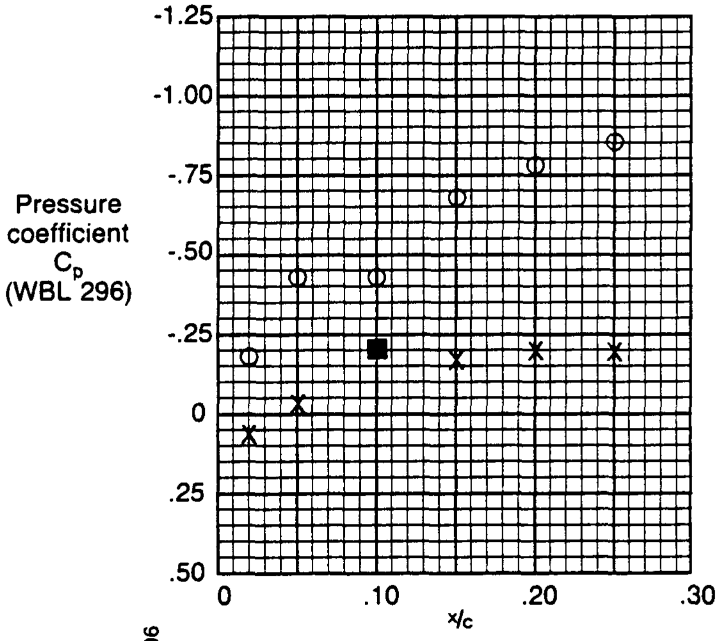
Pressures adjusted by Δ Cp = +.007

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	6	1
5U	.125	6	4	7	1
6U	.15	5	4	5	1
7U	.20	9	8	9	0
8U	.25	222	61	411	109
9U	.30	35	28	45	3
10U	.35	20	17	23	1
Lower					
1L	.020	4	3	5	0
2L	.050	7	6	7	0
3L	.075	10	7	12	1
4L	.100	11	10	13	1
5L	.125	16	12	20	1
6L	.15	19	15	37	2
7L	.20	19	16	22	1
8L	.25	31	26	39	2
9L	.30	55	41	70	5
10L	.35	65	52	80	6

Figure 6-60. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.243

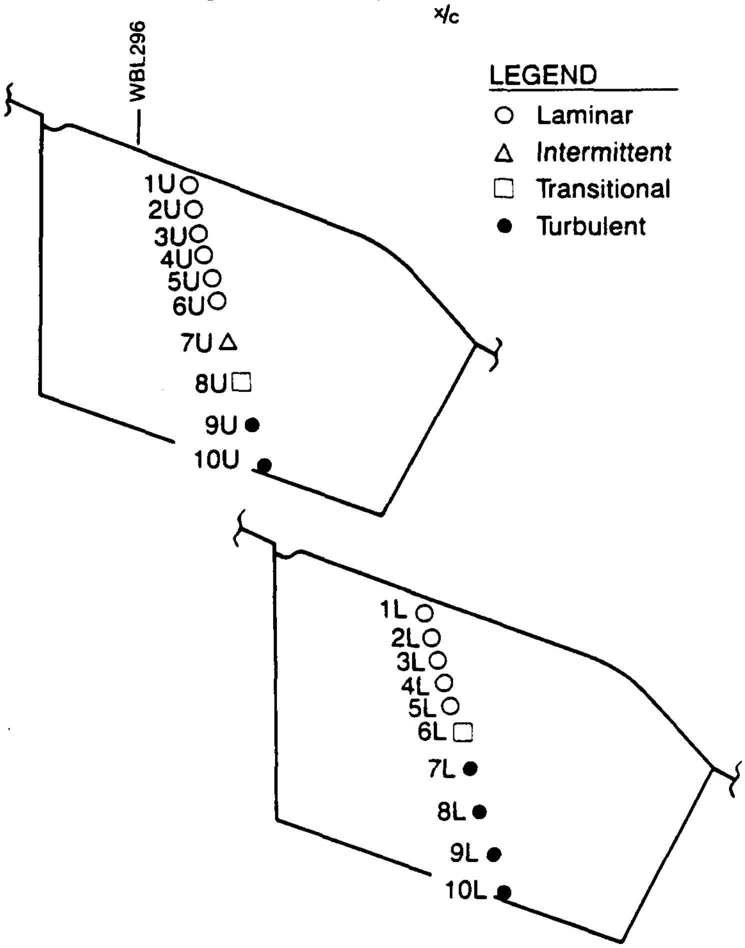


Mach No.	=	.821
Altitude	=	38 972 ft
C_L	=	.452
β	=	-0.3 deg
α_B	=	2.19 deg
$N_{1_{E2}}$	=	3757 r/min

NOTES:

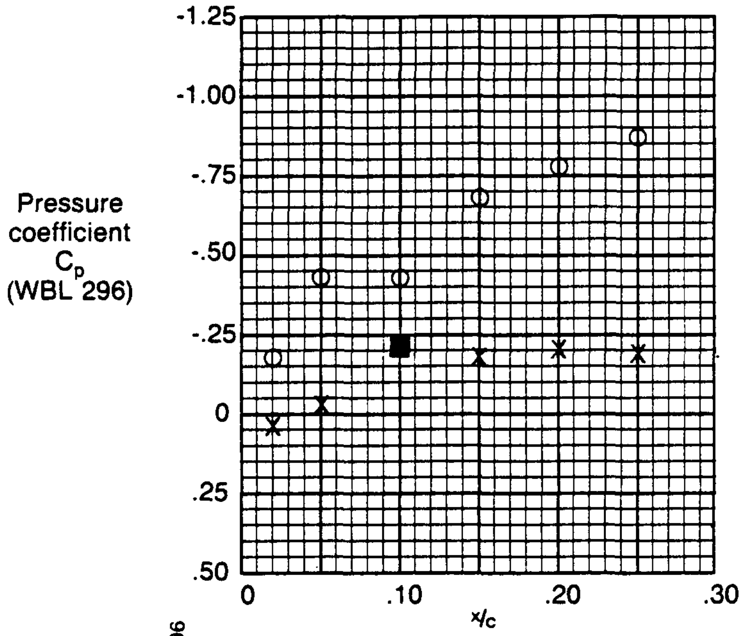
Pressures adjusted by Δ Cp = -.026

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	57	3
3U	.075	8	7	57	3
4U	.100	6	5	144	10
5U	.125	7	4	175	13
6U	.15	9	4	235	23
7U	.20	14	8	286	25
8U	.25	236	146	398	42
9U	.30	35	28	70	4
10U	.35	19	16	23	1
Lower					
1L	.020	3	3	4	0
2L	.050	7	6	46	2
3L	.075	9	7	108	6
4L	.100	11	10	27	1
5L	.125	15	11	39	2
6L	.15	27	15	358	27
7L	.20	19	16	96	6
8L	.25	32	27	39	2
9L	.30	56	44	74	6
10L	.35	65	50	82	6

Figure 6-61. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.244

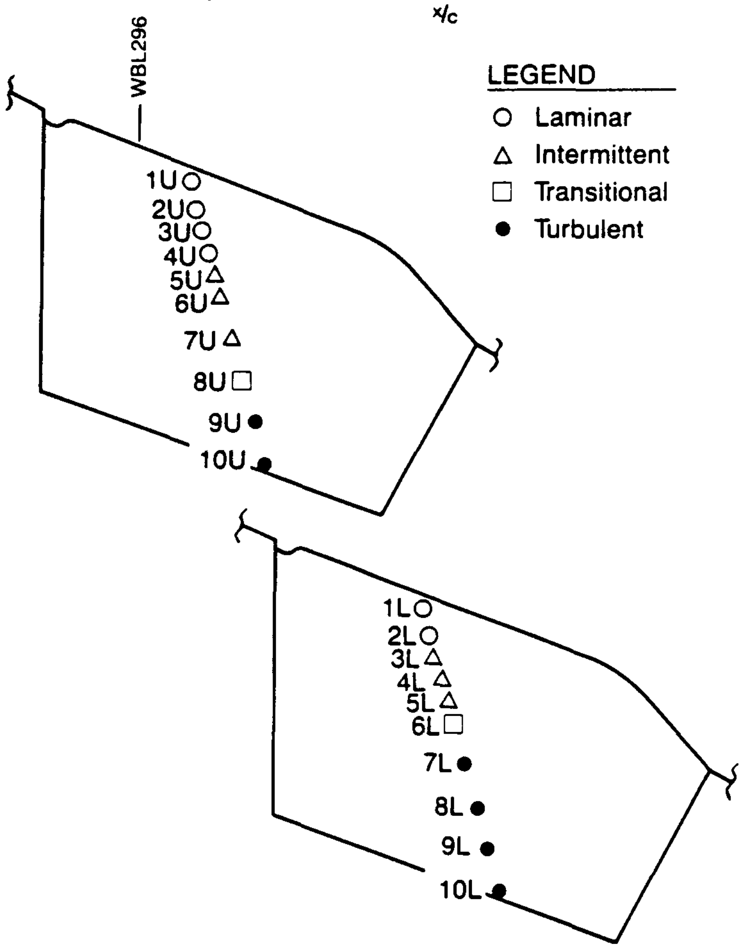


Mach No. = .821
Altitude = 38 974 ft
C_L = .450
β = -0.3 deg
α_B = 2.18 deg
$N_{1_{E2}}$ = 3542 r/min

NOTES:

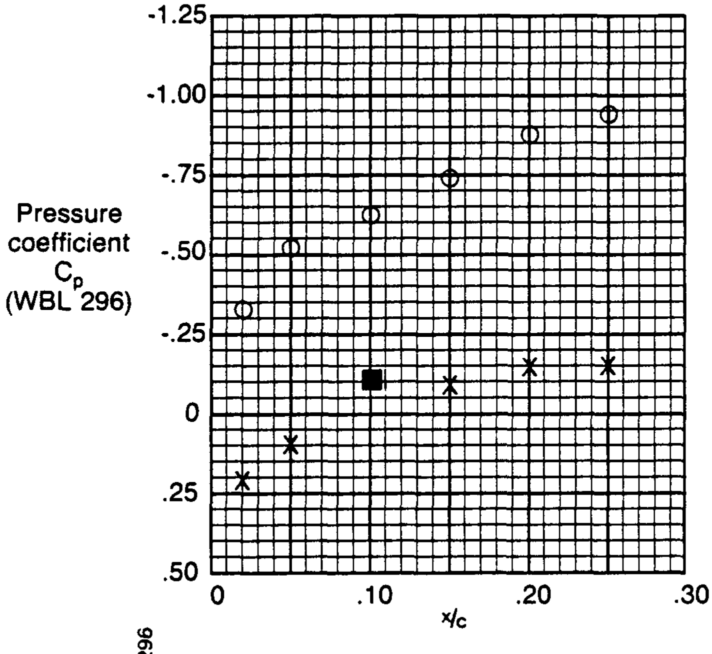
Pressures adjusted by Δ Cp = -.032

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	117	8
3U	.075	10	7	172	13
4U	.100	10	5	165	19
5U	.125	14	4	311	34
6U	.15	13	5	199	26
7U	.20	31	8	385	55
8U	.25	259	169	428	49
9U	.30	37	27	67	6
10U	.35	19	16	26	2
Lower					
1L	.020	3	2	15	1
2L	.050	7	6	56	4
3L	.075	11	7	236	16
4L	.100	16	10	286	26
5L	.125	22	12	311	33
6L	.15	55	19	426	62
7L	.20	21	16	130	12
8L	.25	33	26	177	9
9L	.30	57	44	78	5
10L	.35	66	50	86	6

Figure 6-62. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.245



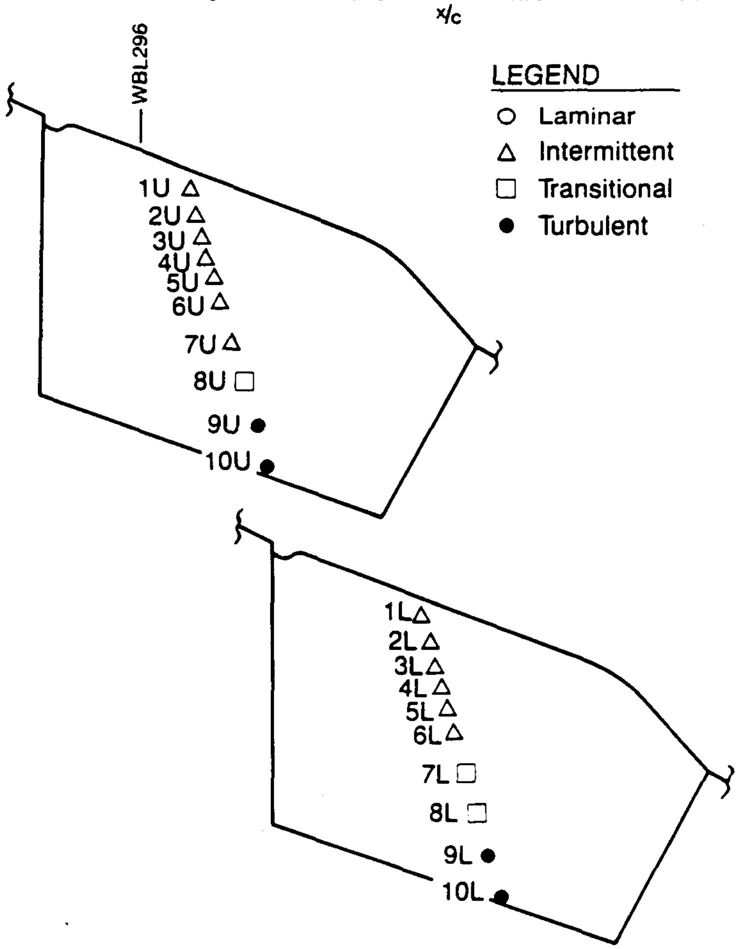
Mach No.	=	.816
Altitude	=	38 989 ft
C_L	=	.455
β	=	+4.0 deg
α_B	=	2.58 deg
N_{1E2}	=	3988 r/min

NOTES:

Pressures adjusted by Δ Cp = -.032

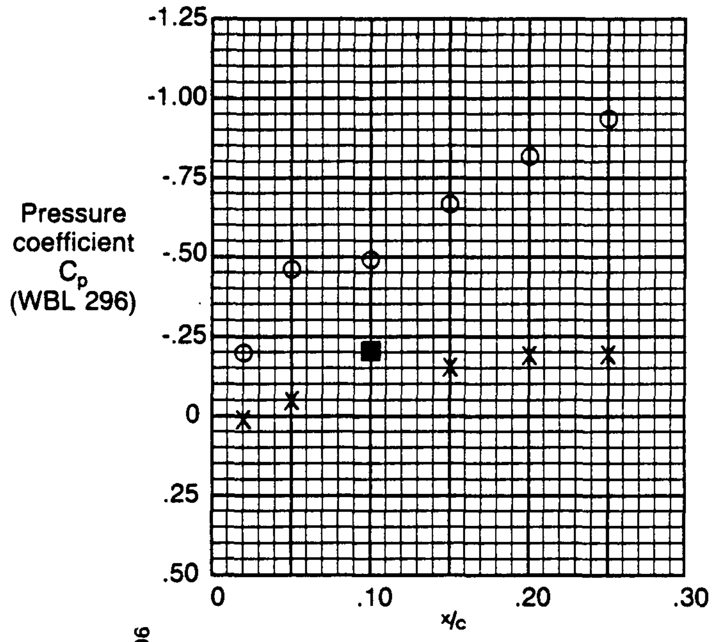
■ = Invalid data point—shown for documentation only

Data affected by cirrus clouds



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	13	5	67	12
2U	.050	64	5	237	66
3U	.075	127	7	406	121
4U	.100	195	5	526	184
5U	.125	259	4	613	236
6U	.15	257	4	573	224
7U	.20	252	9	540	193
8U	.25	88	35	381	65
9U	.30	43	33	75	6
10U	.35	21	17	28	2
Lower					
1L	.020	16	3	104	21
2L	.050	67	6	250	66
3L	.075	158	6	465	149
4L	.100	193	8	467	171
5L	.125	237	11	504	202
6L	.15	291	13	609	245
7L	.20	163	43	252	45
8L	.25	66	25	290	52
9L	.30	65	41	152	15
10L	.35	66	51	92	7

Figure 6-63. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.246



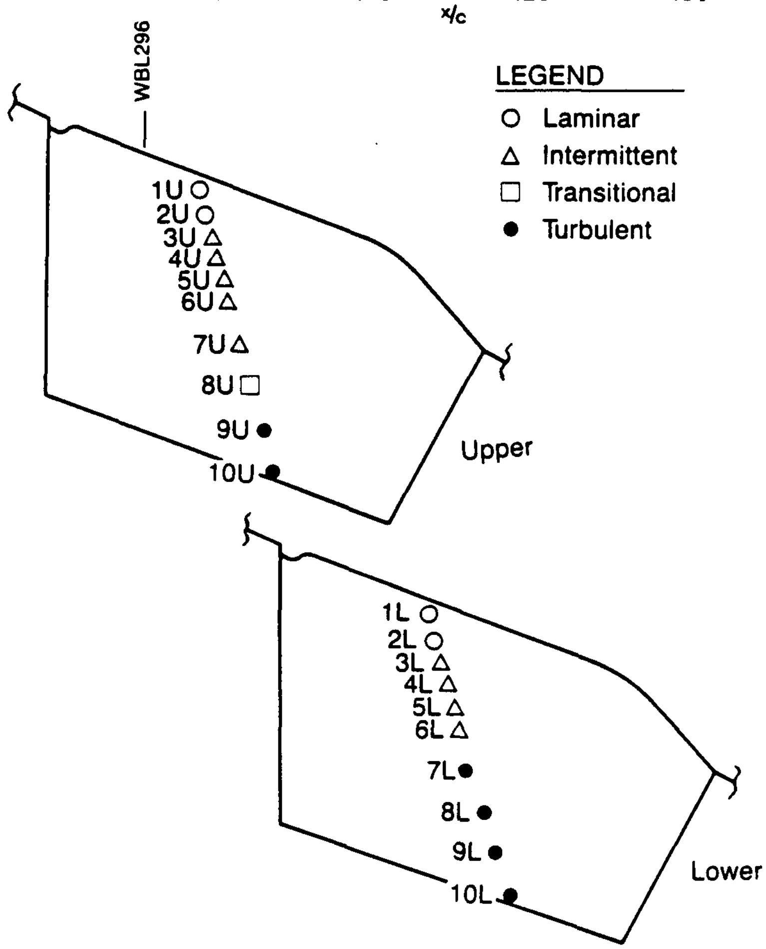
Mach No. = .813
Altitude = 38 548 ft
C_L = .447
β = -0.7 deg
α_B = 2.30 deg
$N_{1_{E2}}$ = 2260 r/min

NOTES:

Pressures adjusted by Δ Cp = -.083

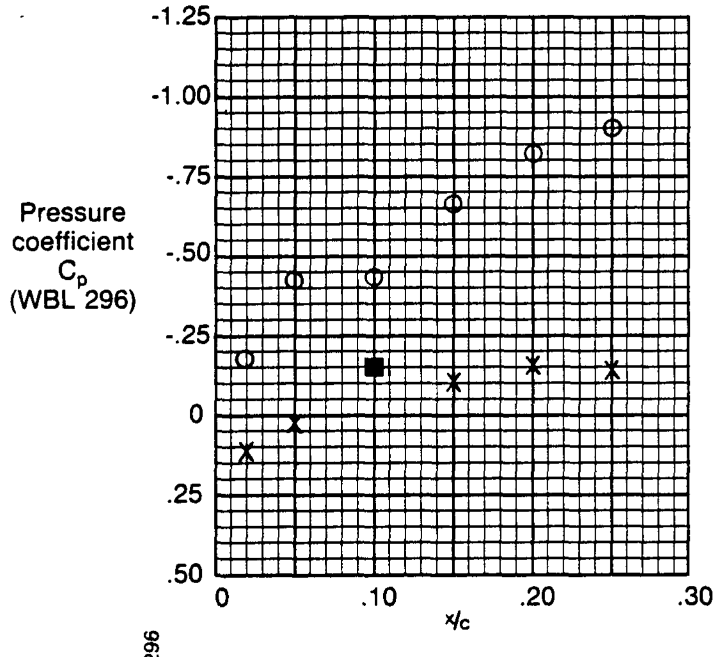
■ = Invalid data point—shown for documentation only

Possible light cirrus



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	26	1
2U	.050	6	5	56	5
3U	.075	11	7	216	18
4U	.100	14	5	262	30
5U	.125	20	4	233	39
6U	.15	18	5	297	39
7U	.20	40	8	340	65
8U	.25	337	146	464	66
9U	.30	37	27	85	8
10U	.35	19	16	26	1
Lower					
1L	.020	2	2	23	2
2L	.050	8	5	63	8
3L	.075	12	3	257	30
4L	.100	18	6	244	35
5L	.125	28	4	319	51
6L	.15	71	6	494	96
7L	.20	28	16	184	24
8L	.25	33	27	98	7
9L	.30	57	45	78	6
10L	.35	66	50	85	6

Figure 6-64. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.247

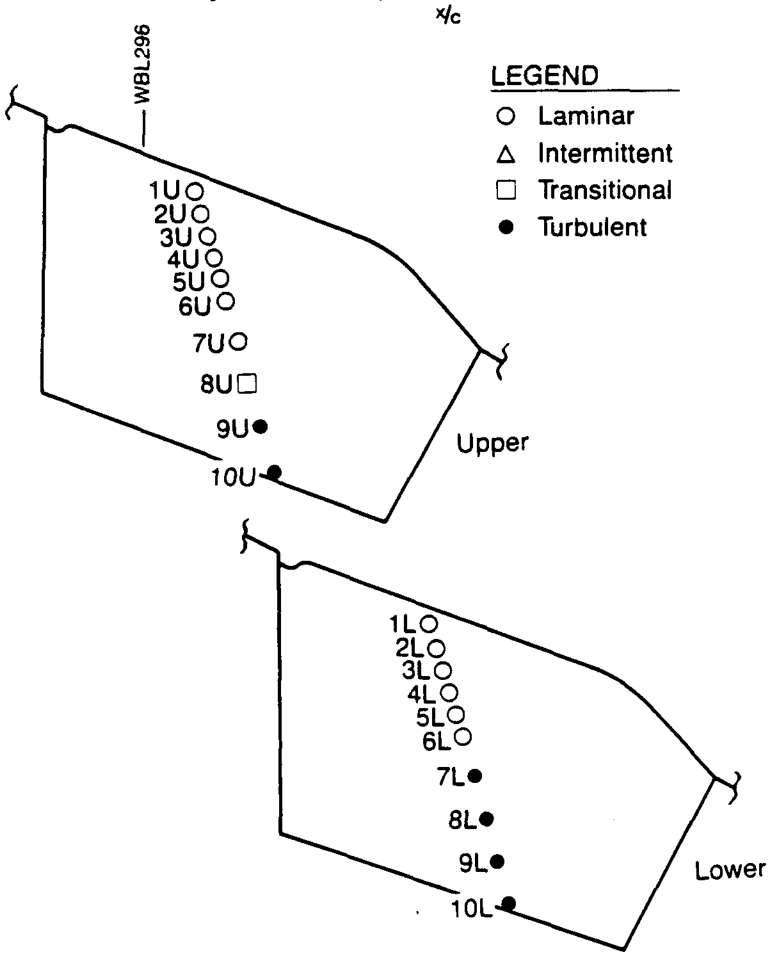


Mach No. = .822
Altitude = 38 990 ft
C_L = .480
β = +0.2 deg
α_B = 2.39 deg
$N_{1_{E2}}$ = 3692 r/min

NOTES:

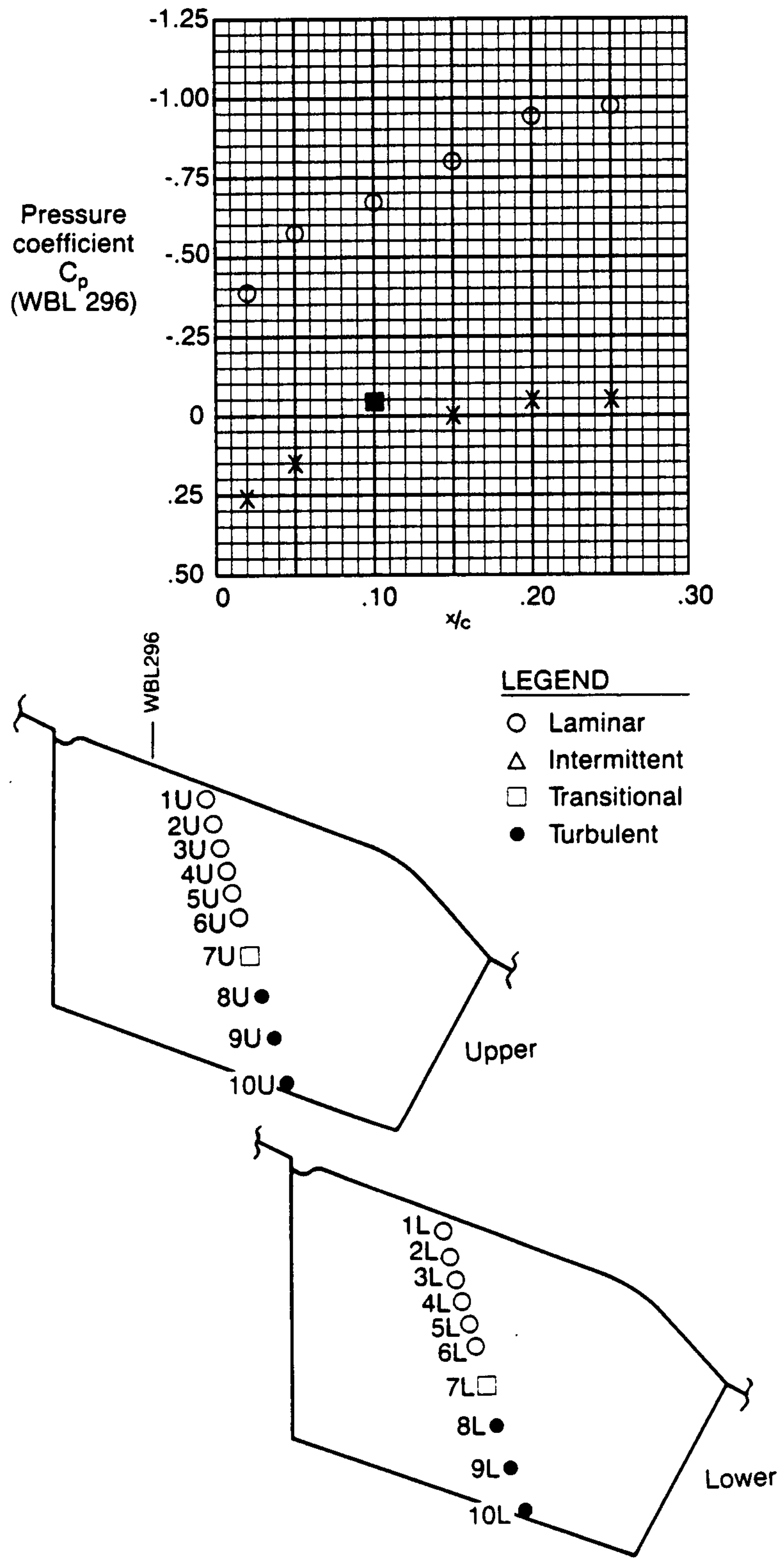
Pressures adjusted by Δ Cp = +.087

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	6	1
5U	.125	5	4	7	1
6U	.15	4	4	5	0
7U	.20	8	8	9	1
8U	.25	78	39	206	28
9U	.30	35	29	46	3
10U	.35	20	17	26	2
Lower					
1L	.020	3	3	5	1
2L	.050	7	6	7	1
3L	.075	8	7	9	1
4L	.100	10	10	12	1
5L	.125	13	11	16	1
6L	.15	16	13	19	1
7L	.20	19	17	25	1
8L	.25	32	26	38	2
9L	.30	57	44	78	6
10L	.35	67	51	88	6

Figure 6-65. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.248



Mach No. = .784
Altitude = 38 993 ft
C_L = .527
β = 0.0 deg
α_B = 3.04 deg
$N_{1_{E2}}$ = 3392 r/min

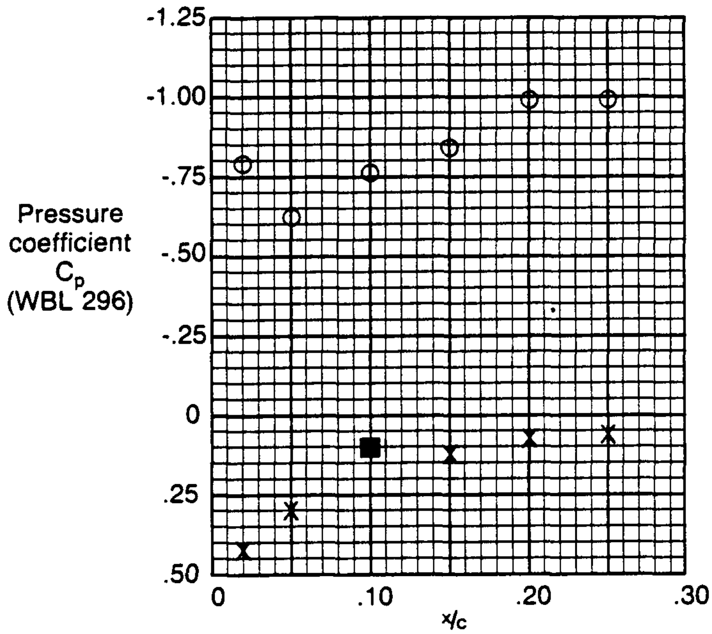
NOTES:

Pressures adjusted by Δ Cp = +.109

■ = Invalid data point—shown for documentation only

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	4	5	0
2U	.050	5	5	6	0
3U	.075	8	7	9	1
4U	.100	5	5	5	0
5U	.125	5	4	7	1
6U	.15	9	8	14	1
7U	.20	143	61	248	41
8U	.25	42	36	48	3
9U	.30	42	33	50	3
10U	.35	22	18	29	2
Lower					
1L	.020	3	2	3	1
2L	.050	6	6	6	0
3L	.075	6	5	7	1
4L	.100	8	7	10	0
5L	.125	10	9	12	1
6L	.15	12	11	14	1
7L	.20	37	18	111	15
8L	.25	31	26	38	2
9L	.30	55	45	70	5
10L	.35	65	51	78	6

Figure 6-66. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.249

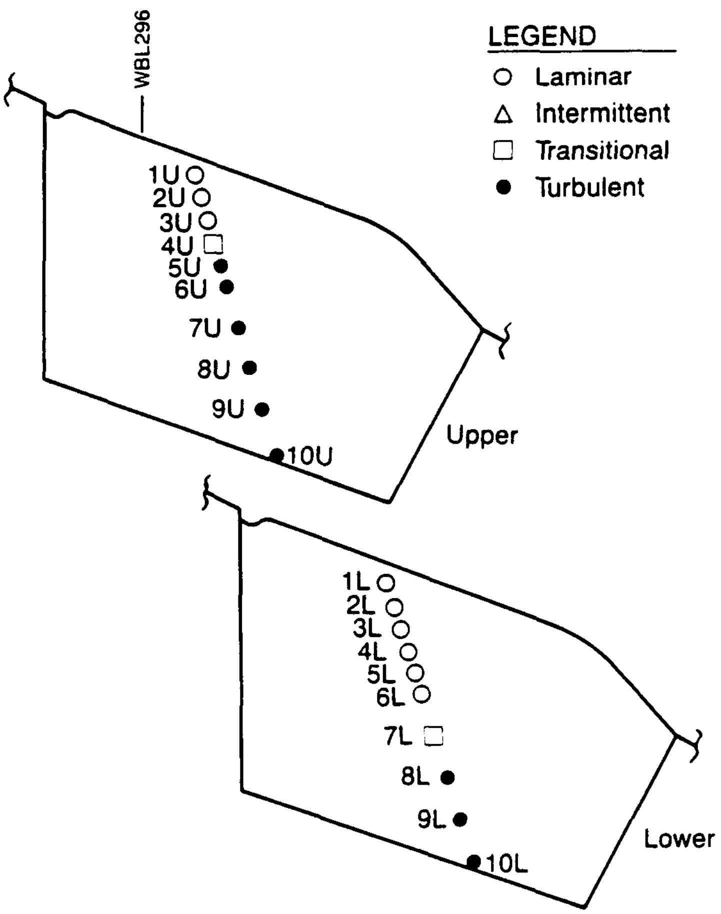


Mach No. = .752
Altitude = 38 999 ft
C_L = .573
β = +0.1 deg
α_B = 3.63 deg
$N_{1_{E2}}$ = 3382 r/min

NOTES:

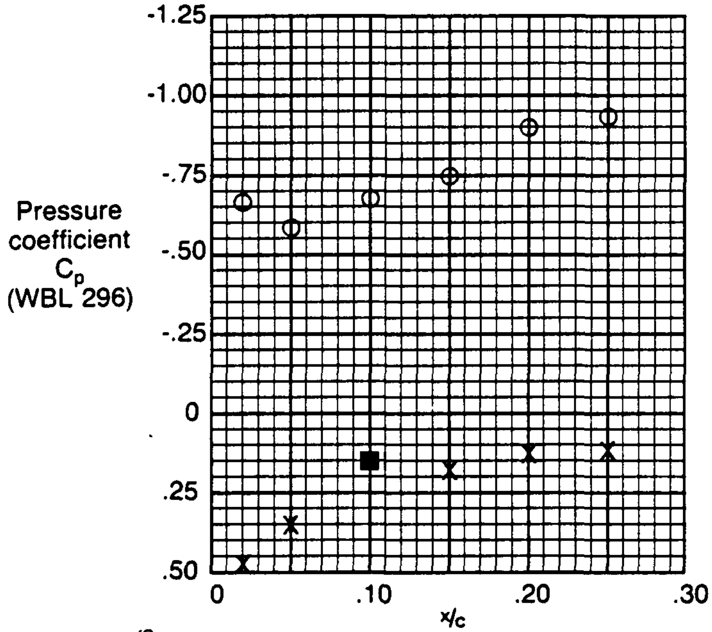
Pressures adjusted by Δ Cp = +.173

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	6	0
2U	.050	5	5	6	1
3U	.075	8	7	9	1
4U	.100	251	18	501	133
5U	.125	39	29	76	5
6U	.15	38	30	47	3
7U	.20	48	40	57	3
8U	.25	53	45	71	4
9U	.30	50	39	65	5
10U	.35	31	23	41	3
Lower					
1L	.020	2	2	3	0
2L	.050	6	6	6	0
3L	.075	5	4	6	0
4L	.100	8	7	12	1
5L	.125	8	7	14	1
6L	.15	13	10	45	5
7L	.20	54	19	134	25
8L	.25	31	26	58	3
9L	.30	55	41	72	5
10L	.35	64	51	83	6

Figure 6-67. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.250

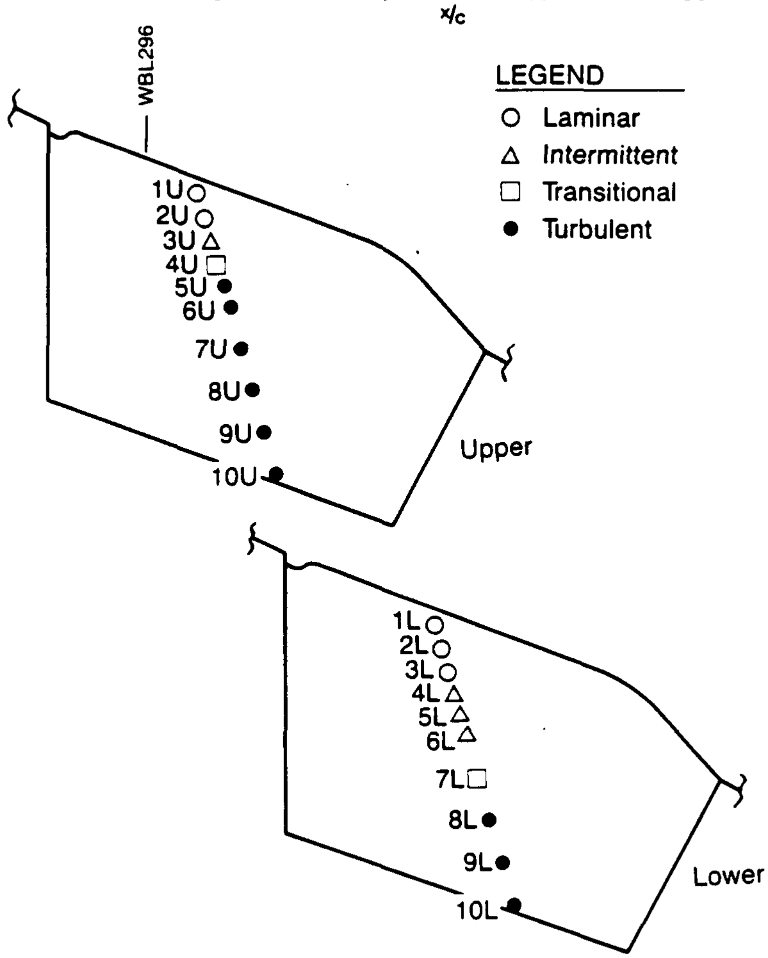


Mach No. = .757
Altitude = 38 997 ft
C_L = .563
β = +0.2 deg
α_B = 3.51 deg
$N_{1_{E2}}$ = 4023 r/min

NOTES:

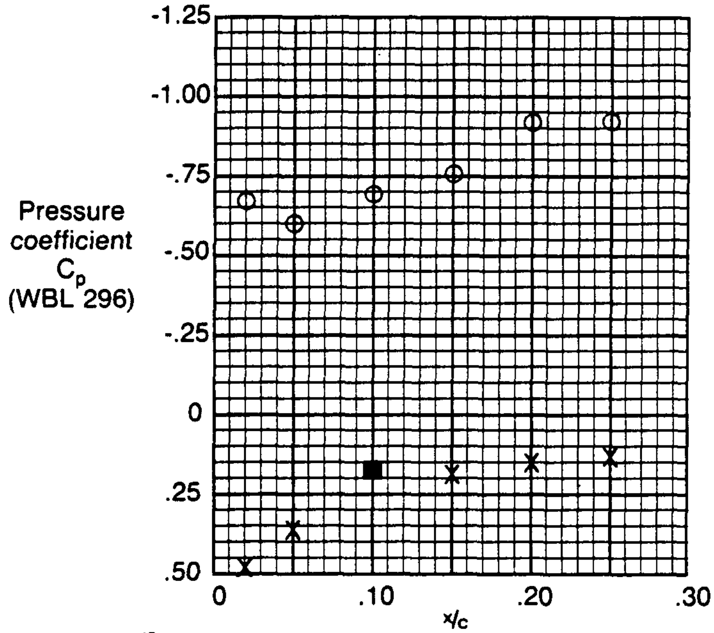
Pressures adjusted by Δ Cp = +.234

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.020	5	5	5	0
2U	.050	6	5	59	4
3U	.075	10	7	191	13
4U	.100	253	48	463	76
5U	.125	40	32	75	5
6U	.15	37	32	46	3
7U	.20	49	41	59	3
8U	.25	53	42	65	4
9U	.30	49	39	63	4
10U	.35	24	19	30	2
Lower					
1L	.020	3	2	3	0
2L	.050	7	6	130	6
3L	.075	8	6	135	10
4L	.100	12	8	166	16
5L	.125	18	9	257	30
6L	.15	31	11	428	58
7L	.20	38	18	217	26
8L	.25	33	26	139	12
9L	.30	56	41	75	5
10L	.35	65	49	83	6

Figure 6-68. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.251

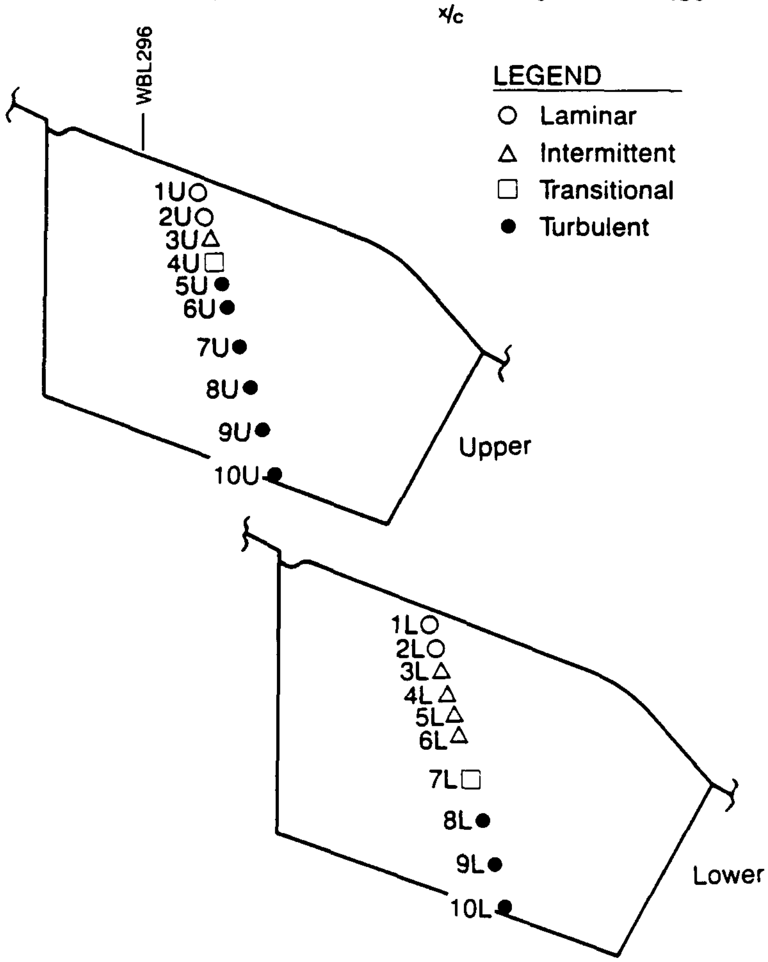


Mach No. = .753
Altitude = 38 994 ft
C_L = .569
β = -0.4 deg
α_B = 3.59 deg
N_{1E2} = 3638 r/min

NOTES:

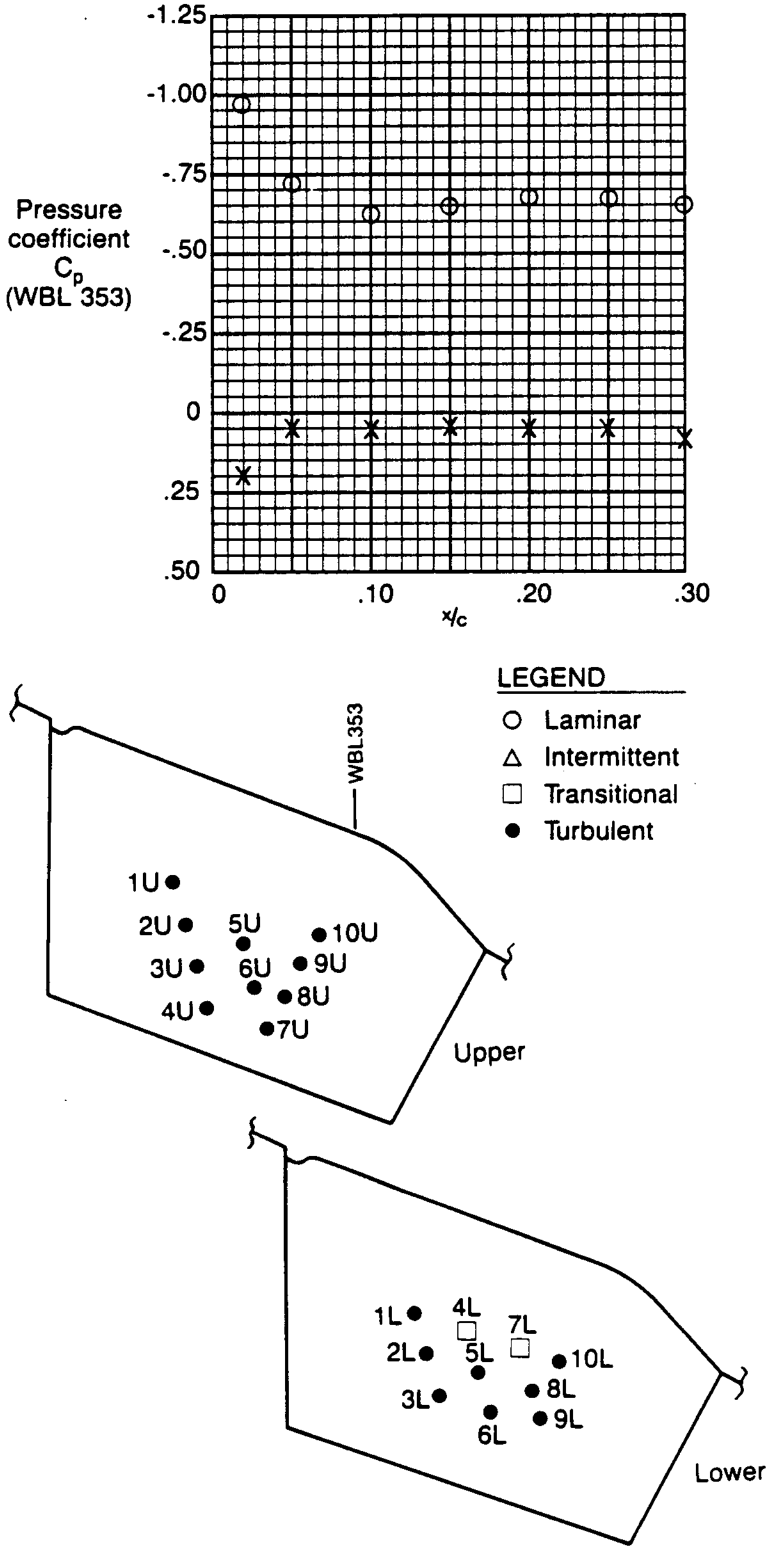
Pressures adjusted by Δ Cp = +.236

■ = Invalid data point—shown for documentation only



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.020	6	5	43	3
2U	.050	8	5	103	11
3U	.075	27	7	232	38
4U	.100	259	52	539	123
5U	.125	41	32	219	14
6U	.15	38	32	47	3
7U	.20	48	40	57	3
8U	.25	53	44	66	3
9U	.30	53	39	75	5
10U	.35	31	25	41	3
Lower					
1L	.020	3	2	18	1
2L	.050	9	6	75	8
3L	.075	18	5	258	36
4L	.100	34	8	264	50
5L	.125	61	10	343	72
6L	.15	119	12	532	129
7L	.20	59	18	214	46
8L	.25	40	25	202	18
9L	.30	58	44	95	7
10L	.35	65	49	84	6

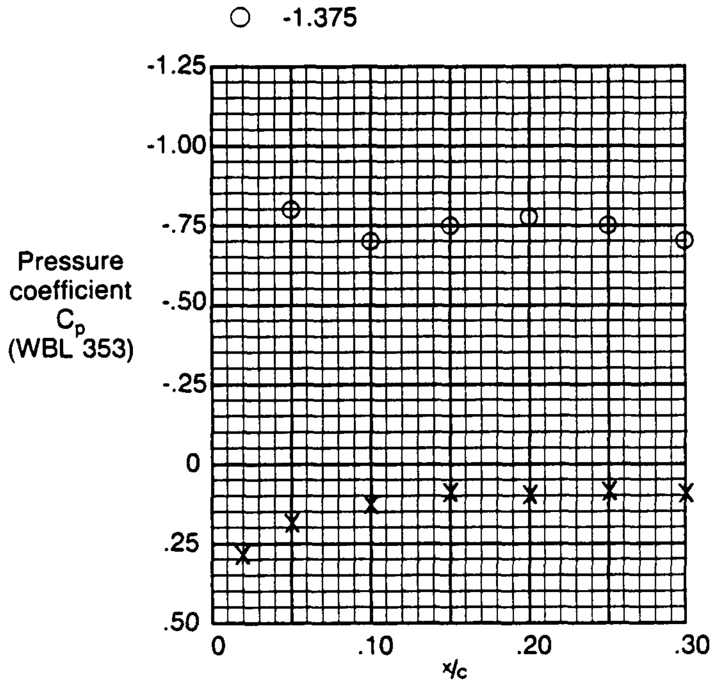
Figure 6-69. Pressure and Hot-Film Data—Flight 2, Condition No. B1.00.0048.252



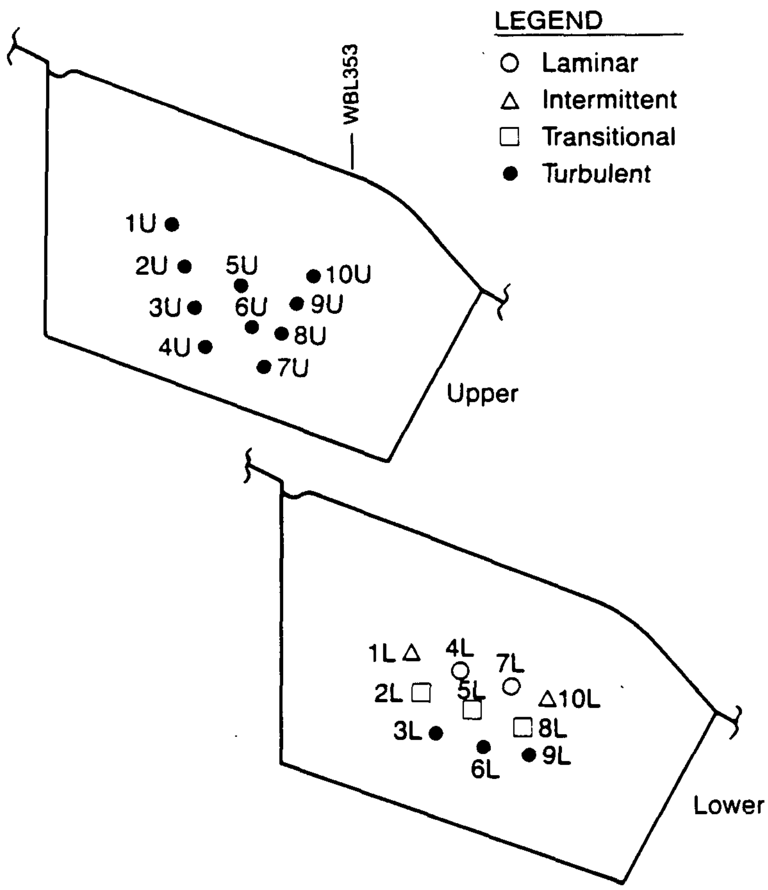
Mach No. = .703
Altitude = 30 009 ft
C_L = .442
β = +0.5 deg
α_B = 2.86 deg
$N_{1_{E2}}$ = 3468 r/min

Hot film no.	$\frac{x}{c}$	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	40	32	50	3
2U	.20	46	37	58	3
3U	.25	65	53	78	5
4U	.30	72	58	91	6
5U	.20	58	47	74	4
6U	.25	73	60	97	6
7U	.30	71	56	94	6
8U	.25	67	51	87	6
9U	.20	56	43	73	4
10U	.15	50	40	60	4
Lower					
1L	.15	37	30	45	3
2L	.20	52	42	71	5
3L	.25	57	45	74	5
4L	.15	548	442	698	47
5L	.20	28	24	35	2
6L	.25	52	41	65	5
7L	.15	395	139	816	135
8L	.20	55	42	75	5
9L	.235	66	49	94	7
10L	.15	45	34	131	8

Figure 6-70. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.001

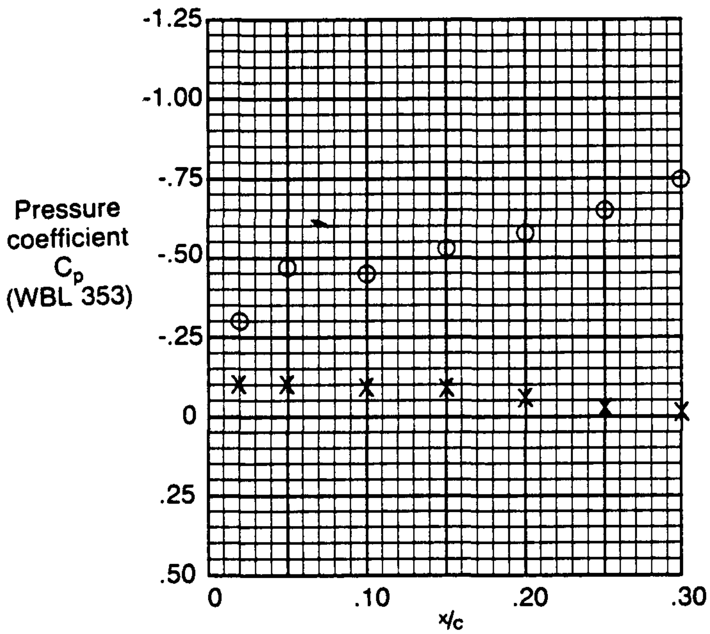


Mach No. = .701
Altitude = 30 005 ft
C_L = .445
β = +5.3 deg
α_B = 3.49 deg
$N_{1_{E2}}$ = 3535 r/min

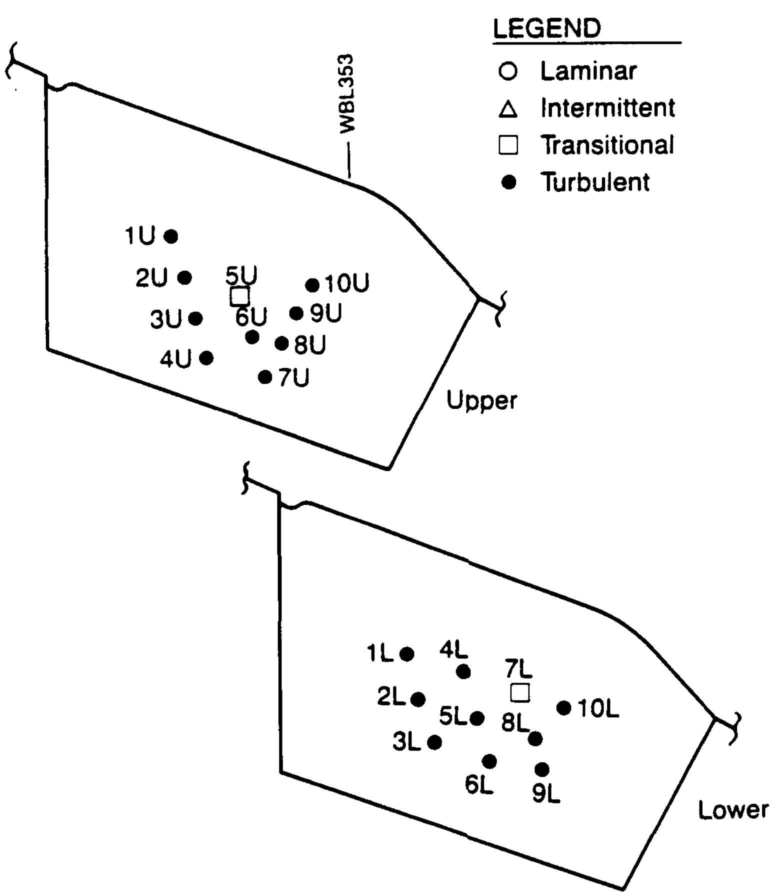


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	50	39	68	4
2U	.20	53	40	70	4
3U	.25	67	55	83	5
4U	.30	76	61	97	7
5U	.20	63	51	83	5
6U	.25	77	63	100	6
7U	.30	76	60	98	7
8U	.25	71	57	94	6
9U	.20	60	44	78	5
10U	.15	52	39	64	4
Lower					
1L	.15	117	8	671	173
2L	.20	152	31	737	200
3L	.25	46	37	70	4
4L	.15	12	8	30	3
5L	.20	227	15	358	74
6L	.25	41	33	53	4
7L	.15	11	7	27	3
8L	.20	312	38	660	139
9L	.235	55	40	78	6
10L	.15	16	9	243	18

Figure 6-71. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.002

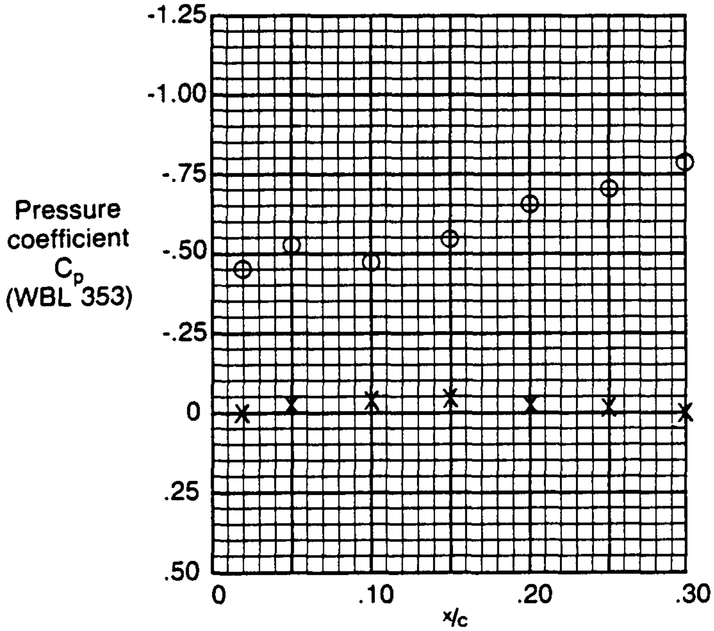


Mach No.	=	.801
Altitude	=	30 728 ft
C_L	=	.350
β	=	0.0 deg
α_B	=	1.69 deg
$N_{1_{E2}}$	=	3602 r/min

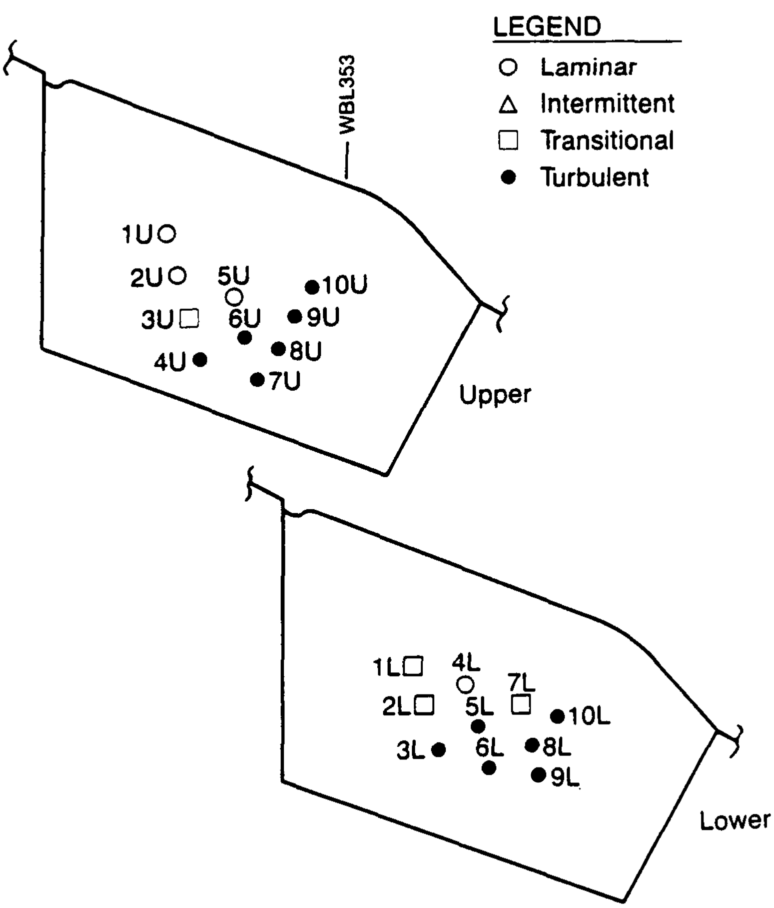


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	40	31	52	3
2U	.20	39	31	48	3
3U	.25	50	41	63	4
4U	.30	55	46	69	4
5U	.20	210	10	621	182
6U	.25	54	45	69	4
7U	.30	58	46	74	5
8U	.25	56	43	72	5
9U	.20	54	43	72	5
10U	.15	46	38	56	4
Lower					
1L	.15	48	36	62	4
2L	.20	64	52	89	6
3L	.25	62	48	84	6
4L	.15	42	32	134	8
5L	.20	27	22	32	2
6L	.25	51	39	67	5
7L	.15	48	32	307	31
8L	.20	49	39	64	4
9L	.235	65	46	86	7
10L	.15	47	35	68	5

Figure 6-72. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.003

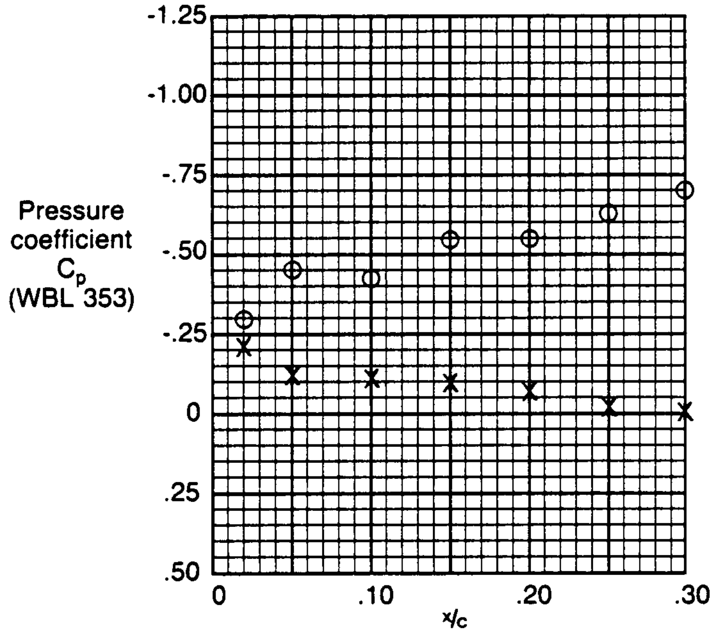


Mach No. = .798
Altitude = 30 721 ft
C_L = .352
β = +3.5 deg
α_B = 2.08 deg
$N_{1_{E2}}$ = 3606 r/min

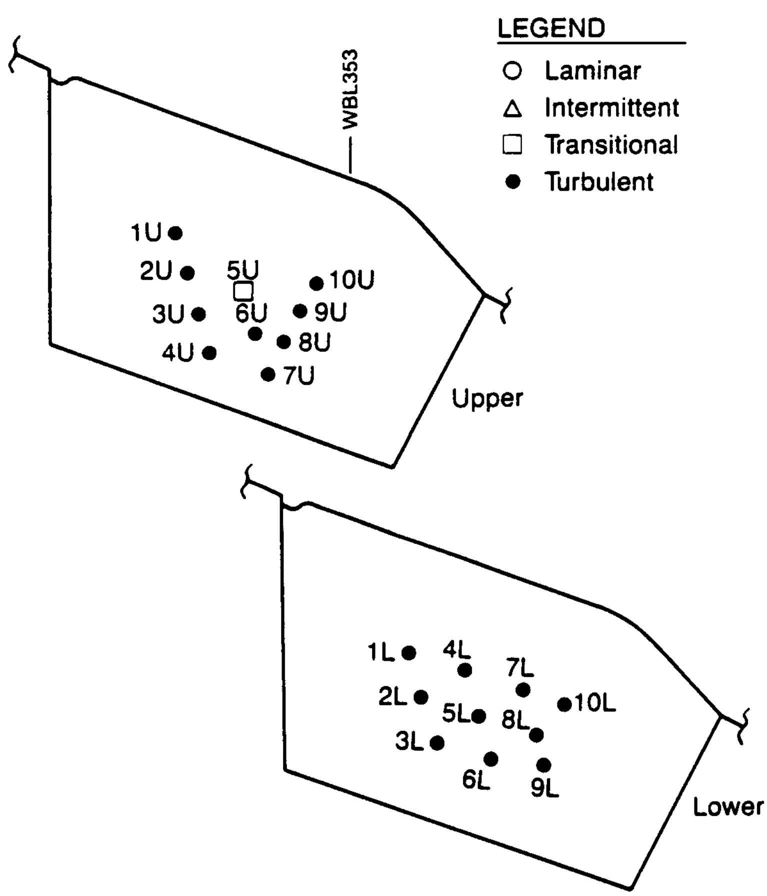


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	6	5	9	1
2U	.20	6	5	12	1
3U	.25	409	144	597	93
4U	.30	38	32	49	3
5U	.20	11	8	139	10
6U	.25	56	39	324	24
7U	.30	47	37	59	4
8U	.25	52	38	66	5
9U	.20	54	41	80	7
10U	.15	40	32	51	3
Lower					
1L	.15	416	42	750	174
2L	.20	98	38	428	50
3L	.25	45	35	59	4
4L	.15	16	12	134	7
5L	.20	24	20	32	2
6L	.25	45	36	58	4
7L	.15	441	44	798	157
8L	.20	43	37	57	4
9L	.235	59	45	80	6
10L	.15	41	32	56	4

Figure 6-73. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.004

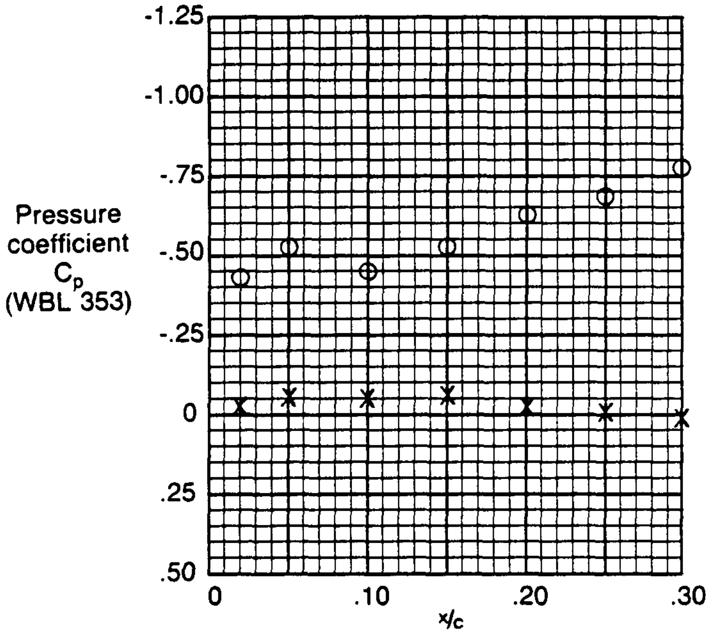


Mach No. = .799
Altitude = 30 682 ft
C_L = .350
β = -3.4 deg
α_B = 2.10 deg
$N_{1_{E2}}$ = 3677 r/min



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	46	35	60	4
2U	.20	43	34	57	4
3U	.25	55	44	68	5
4U	.30	61	48	77	5
5U	.20	60	10	463	52
6U	.25	61	47	75	5
7U	.30	59	45	74	5
8U	.25	59	46	78	6
9U	.20	53	44	68	5
10U	.15	47	37	58	4
Lower					
1L	.15	49	39	64	5
2L	.20	65	51	89	6
3L	.25	67	49	86	7
4L	.15	52	35	210	11
5L	.20	32	24	38	3
6L	.25	59	47	80	6
7L	.15	61	34	150	13
8L	.20	58	44	90	6
9L	.235	71	53	105	8
10L	.15	53	40	70	5

Figure 6-74. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.005

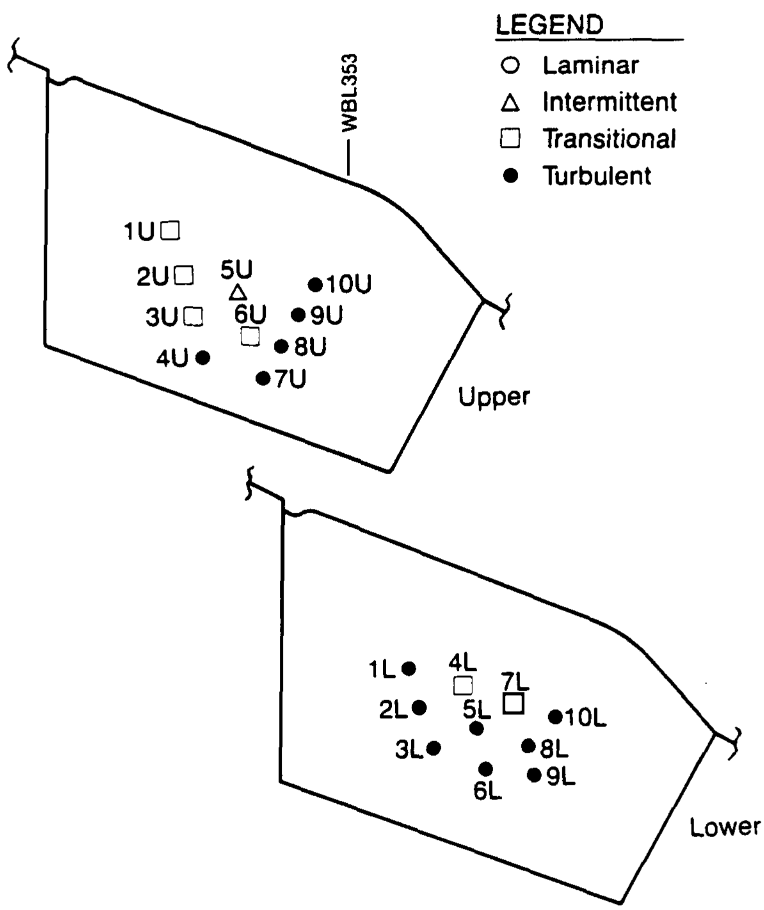


Mach No. = .807
Altitude = 34 669 ft
C_L = .410
β = 0.0 deg
α_B = 2.10 deg
$N_{1_{E2}}$ = 3677 r/min

NOTES:

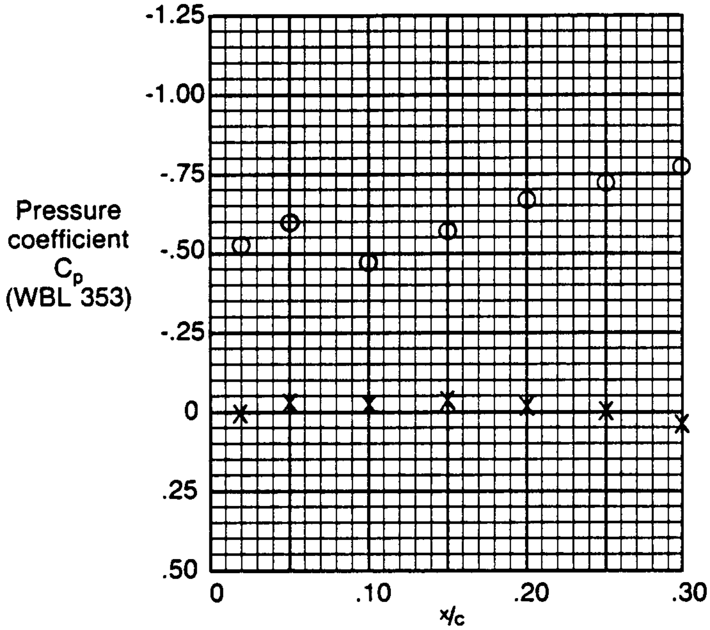
Pressures coefficients were corrected using ΔP_{Port5}

Air was very bumpy and turbulent



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	300	10	633	176
2U	.20	242	13	571	152
3U	.25	270	20	531	156
4U	.30	48	30	88	8
5U	.20	91	8	561	139
6U	.25	210	34	549	125
7U	.30	42	31	57	5
8U	.25	44	33	57	4
9U	.20	43	34	55	4
10U	.15	37	30	50	3
Lower					
1L	.15	45	31	369	27
2L	.20	52	40	86	6
3L	.25	45	34	60	4
4L	.15	310	16	617	141
5L	.20	25	19	156	14
6L	.25	40	33	52	3
7L	.15	154	32	721	152
8L	.20	42	31	86	6
9L	.235	52	38	74	5
10L	.15	41	30	361	21

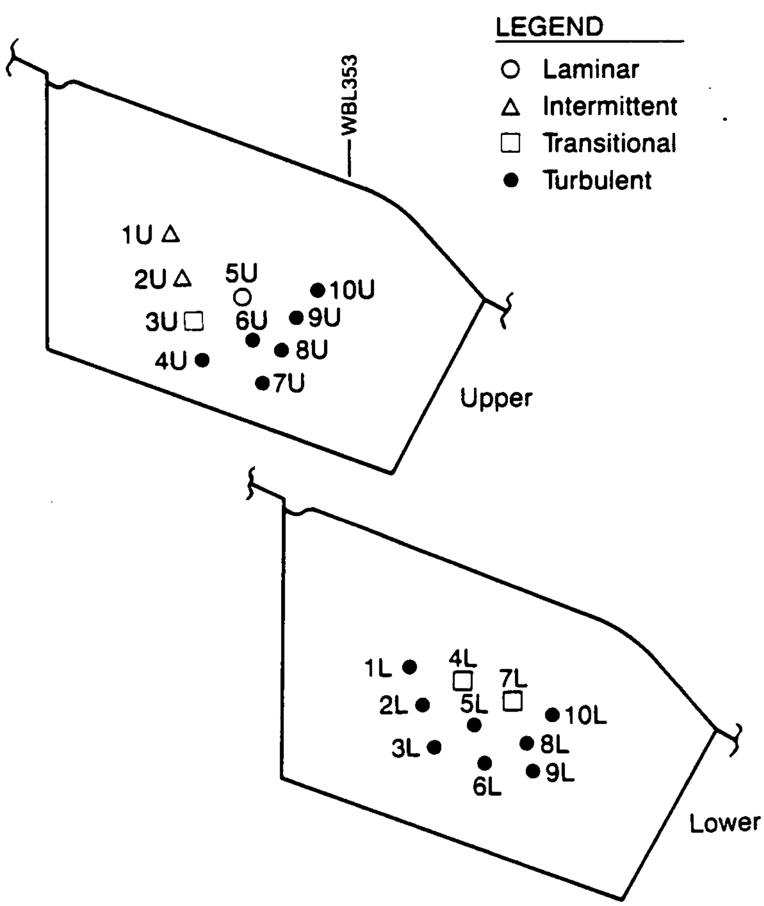
Figure 6-75. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.006



Mach No. = .800
Altitude = 35 062 ft
C_L = .422
β = +0.2 deg
α_B = 2.20 deg
$N_{1_{E2}}$ = 3619 r/min

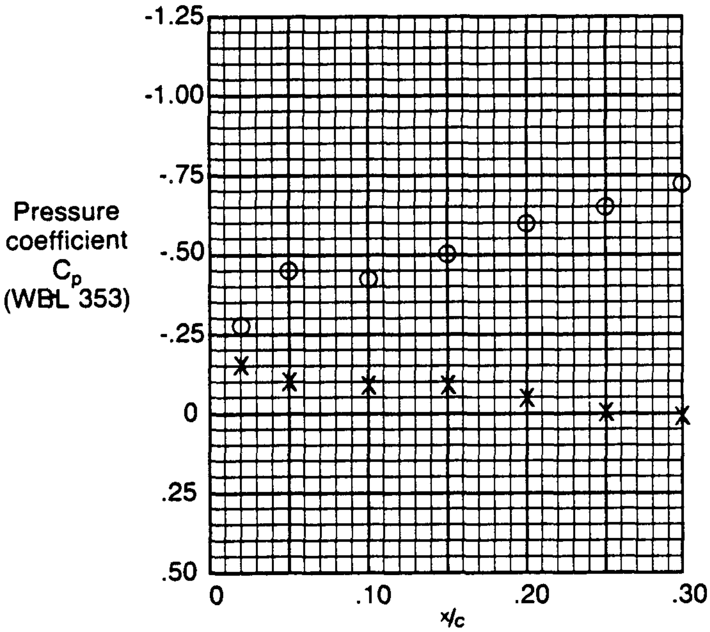
NOTES:

Pressures coefficients were corrected using ΔP_{Port5}



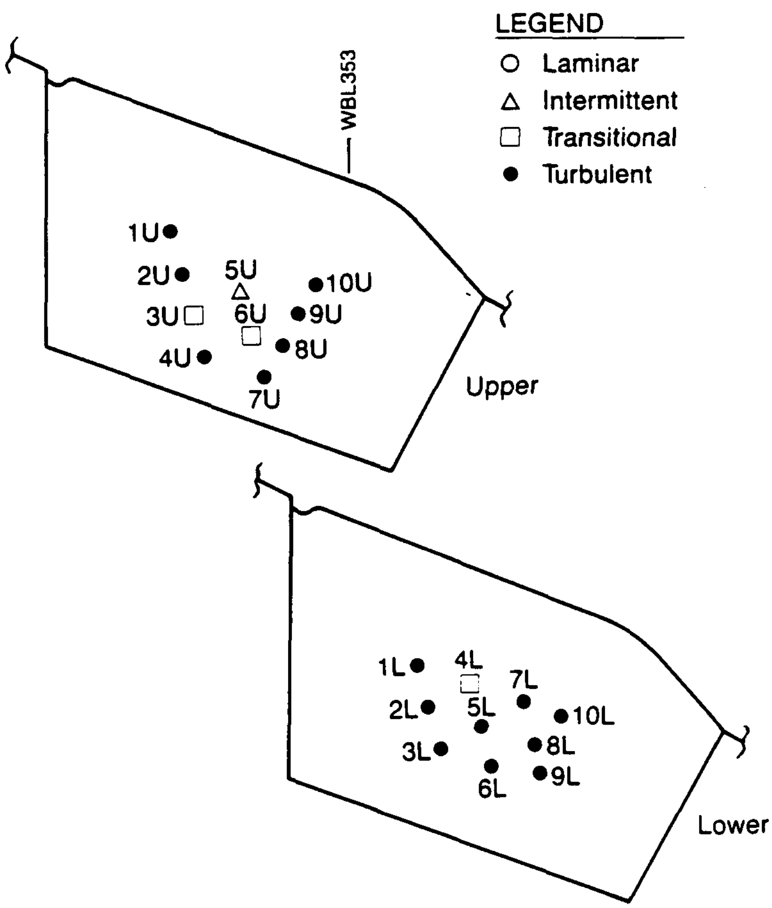
Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	58	5	518	125
2U	.20	26	6	303	52
3U	.25	250	30	419	90
4U	.30	39	33	48	3
5U	.20	9	8	9	0
6U	.25	50	38	73	7
7U	.30	42	32	56	4
8U	.25	51	37	62	4
9U	.20	45	35	57	4
10U	.15	40	32	50	3
Lower					
1L	.15	52	35	111	9
2L	.20	52	38	63	4
3L	.25	49	38	60	4
4L	.15	416	186	595	81
5L	.20	24	19	30	2
6L	.25	43	36	53	3
7L	.15	77	36	249	39
8L	.20	44	37	55	3
9L	.235	56	44	70	6
10L	.15	41	33	52	4

Figure 6-76. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.006.1



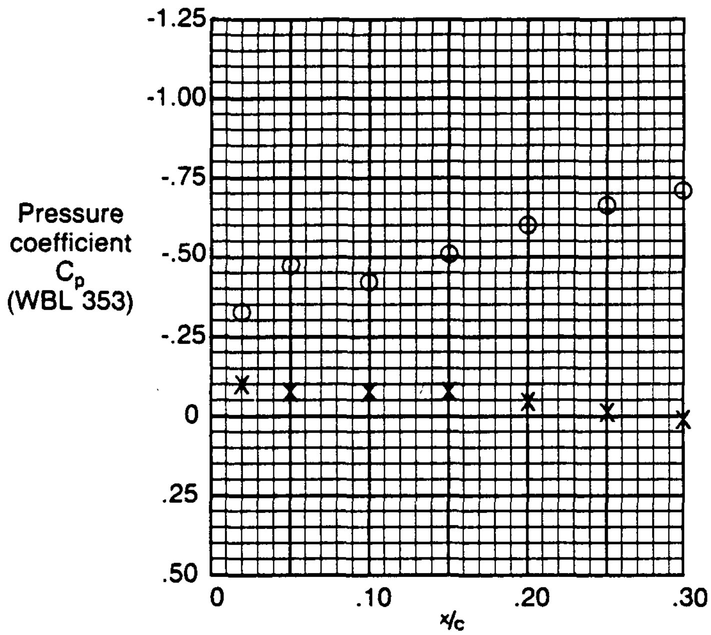
Mach No. = .820
Altitude = 34 688 ft
C_L = .398
β = 0.0 deg
α_B = 1.90 deg
$N_{1_{E2}}$ = 3746 r/min

NOTE:
Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	$\frac{x}{c}$	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	41	26	302	29
2U	.20	37	26	349	26
3U	.25	55	30	514	61
4U	.30	44	33	61	5
5U	.20	77	8	630	134
6U	.25	134	33	501	121
7U	.30	44	33	64	5
8U	.25	46	37	57	4
9U	.20	44	34	57	4
10U	.15	36	29	50	3
Lower					
1L	.15	41	31	54	4
2L	.20	55	44	72	5
3L	.25	51	38	69	5
4L	.15	295	36	627	165
5L	.20	23	19	29	2
6L	.25	42	35	52	4
7L	.15	40	27	329	24
8L	.20	41	31	52	4
9L	.235	54	41	74	6
10L	.15	41	33	85	4

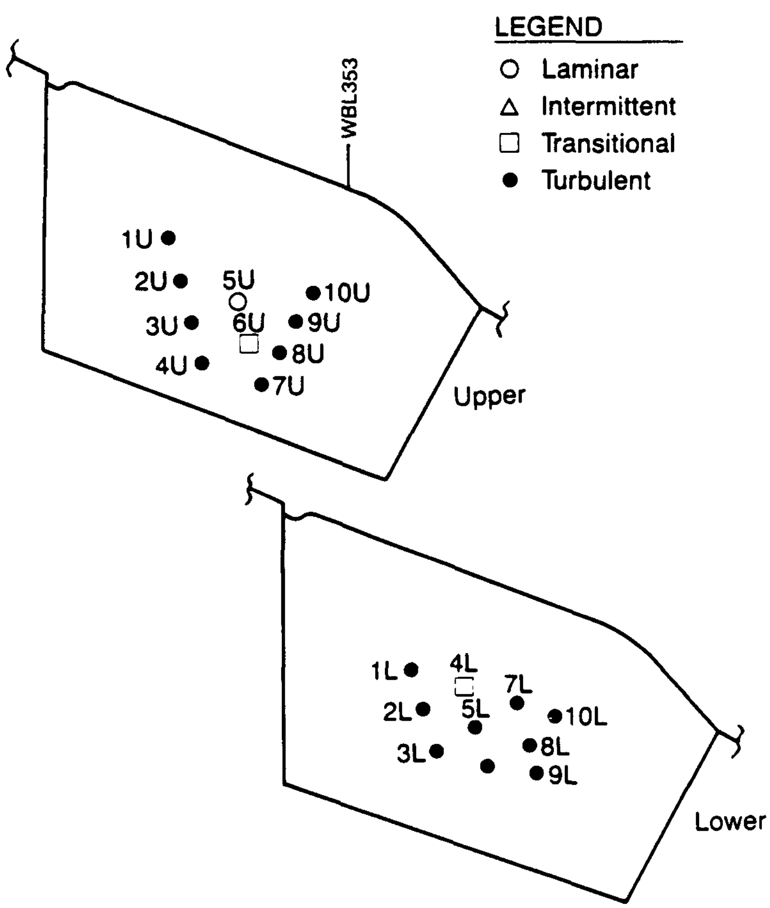
Figure 6-77. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.007



Mach No. = .817
Altitude = 35 065 ft
C_L = .405
β = +0.1 deg
α_B = 1.95 deg
N_{1E2} = 3691 r/min

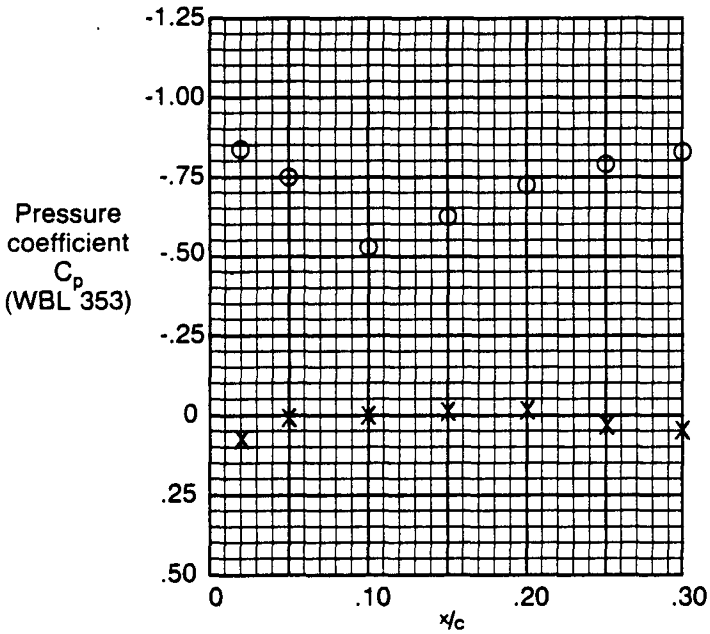
NOTES:

Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	36	29	45	3
2U	.20	32	25	39	2
3U	.25	42	33	194	12
4U	.30	47	38	58	4
5U	.20	9	8	119	7
6U	.25	127	33	444	100
7U	.30	45	33	65	6
8U	.25	48	40	66	4
9U	.20	48	39	62	4
10U	.15	38	31	49	3
Lower					
1L	.15	44	35	58	4
2L	.20	59	47	80	5
3L	.25	52	42	67	4
4L	.15	270	39	550	122
5L	.20	24	20	30	2
6L	.25	45	36	55	4
7L	.15	38	31	46	3
8L	.20	45	35	57	4
9L	.235	58	47	79	6
10L	.15	43	34	55	4

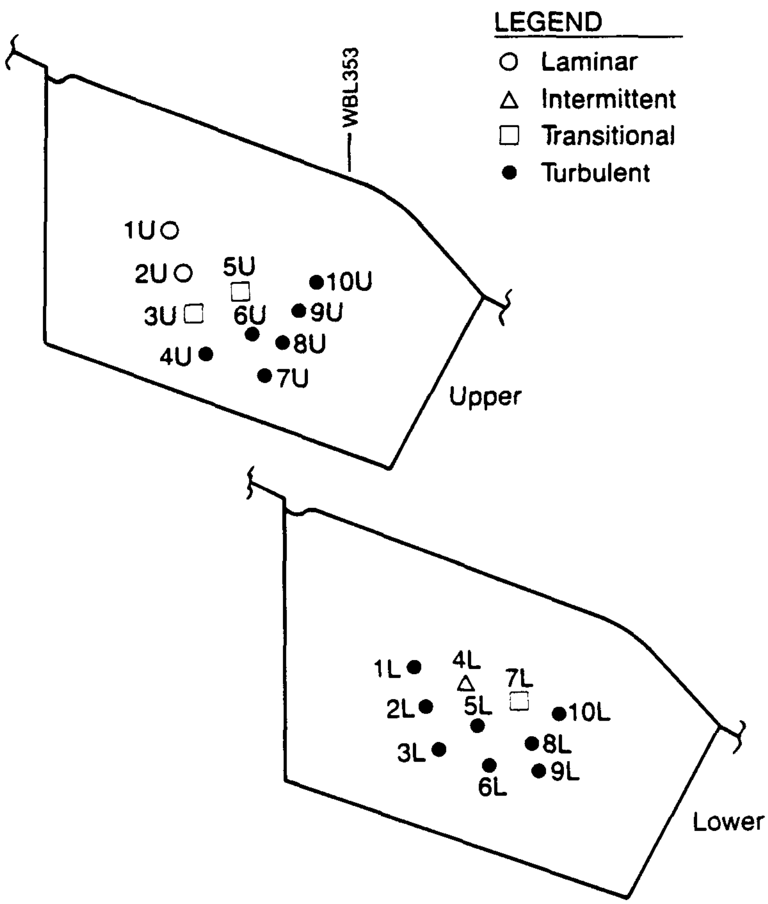
Figure 6-78. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.007.1



Mach No. = .780
Altitude = 35 067 ft
C_L = .444
β = +0.2 deg
α_B = 2.47 deg
$N_{1_{E2}}$ = 3585 r/min

NOTES:

Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	6	0
2U	.20	6	5	6	1
3U	.25	85	43	175	25
4U	.30	39	33	49	3
5U	.20	241	32	492	104
6U	.25	50	39	63	3
7U	.30	47	33	60	4
8U	.25	46	36	58	4
9U	.20	43	34	54	4
10U	.15	41	33	52	3
Lower					
1L	.15	38	29	89	7
2L	.20	52	41	85	6
3L	.25	46	36	59	4
4L	.15	54	14	224	39
5L	.20	25	21	30	2
6L	.25	41	32	51	3
7L	.15	559	396	712	58
8L	.20	42	34	54	4
9L	.235	54	39	71	5
10L	.15	39	31	49	3

Figure 6-79. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.008

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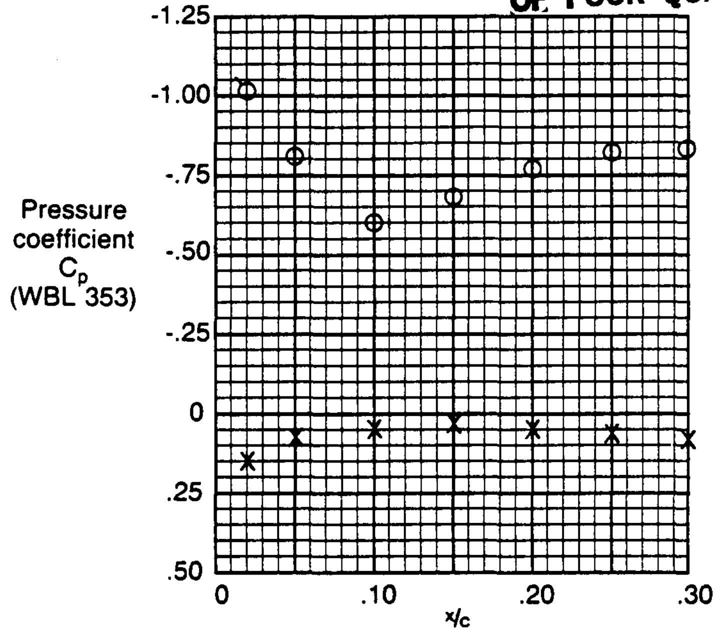
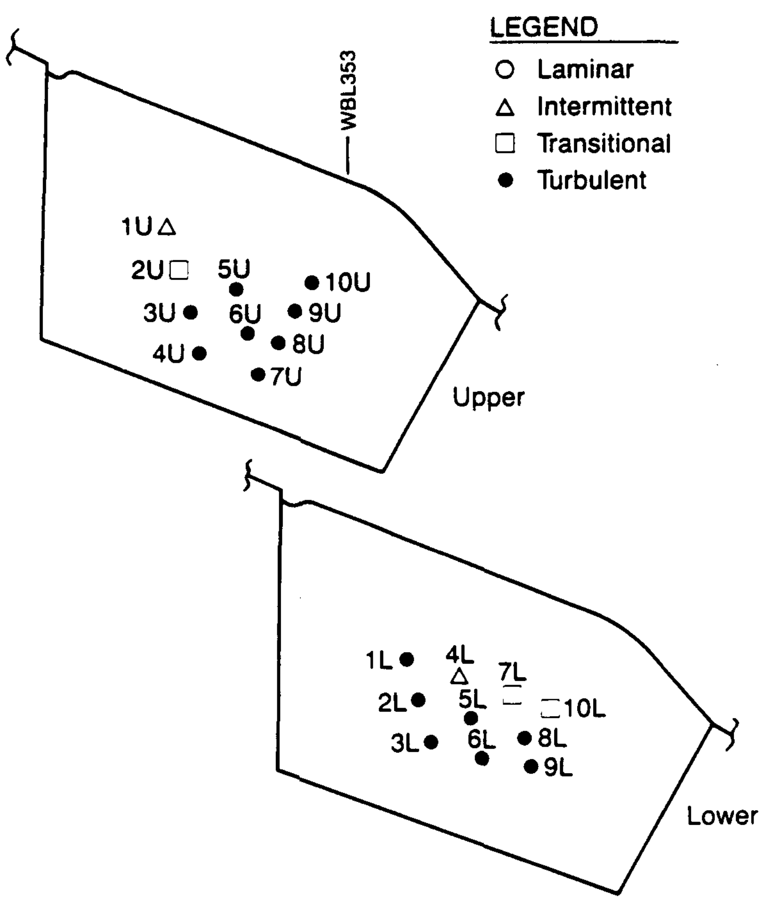


Mach No. = .753
Altitude = 35 075 ft
C_L = .476
β = +0.3 deg
α_B = 2.95 deg
$N_{1_{E2}}$ = 3558 r/min

NOTES:

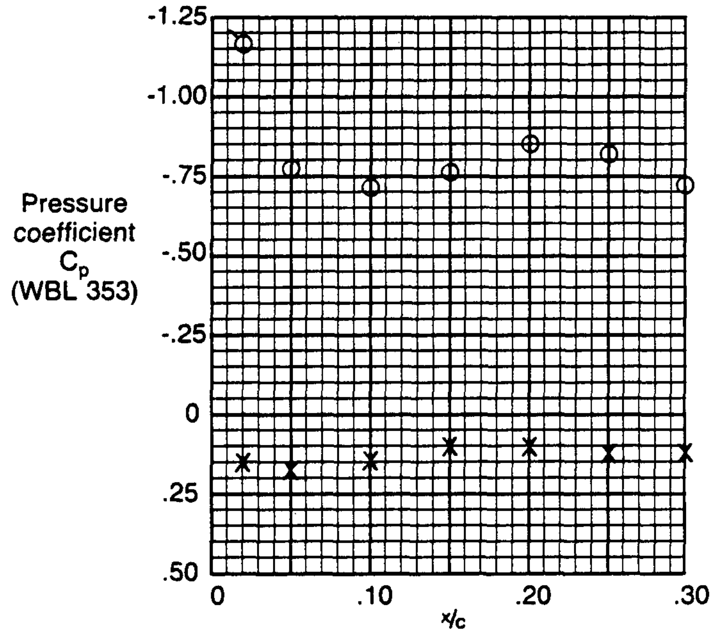
Pressure coefficients corrected using ΔP_{Port5}

= Pressure limited by transducer limit



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	96	5	600	132
2U	.20	337	43	605	144
3U	.25	45	37	59	4
4U	.30	58	48	71	5
5U	.20	46	39	57	3
6U	.25	54	46	68	4
7U	.30	52	44	64	4
8U	.25	51	39	64	4
9U	.20	47	39	60	4
10U	.15	44	36	58	3
Lower					
1L	.15	37	29	50	4
2L	.20	48	38	65	5
3L	.25	48	38	62	4
4L	.15	32	15	113	17
5L	.20	25	21	30	2
6L	.25	40	33	48	3
7L	.15	275	35	611	147
8L	.20	44	35	57	4
9L	.235	54	41	69	5
10L	.15	189	59	426	63

Figure 6-80. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.009

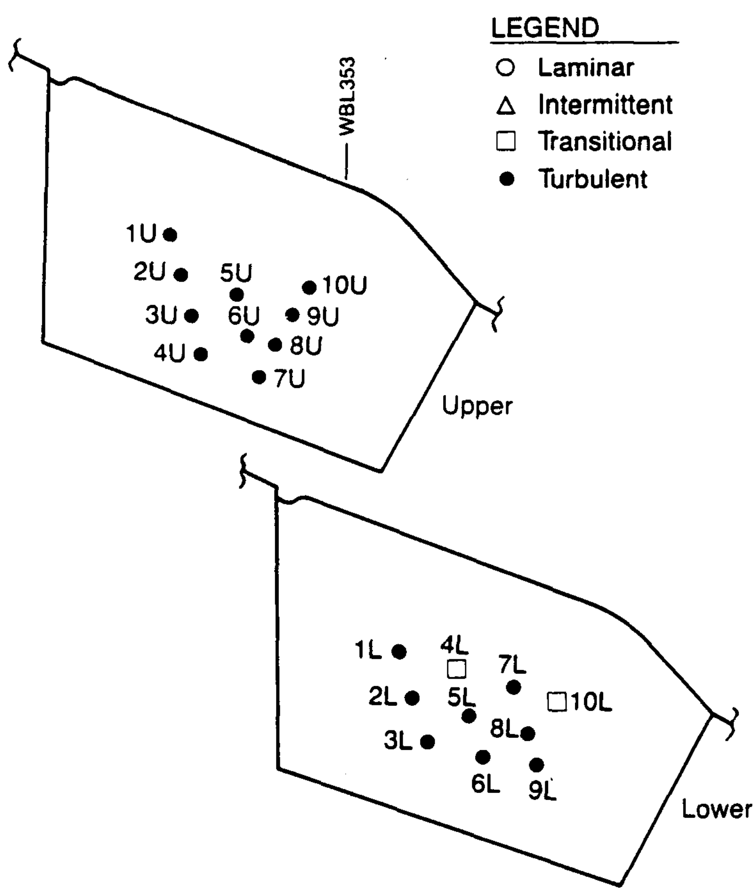


Mach No. = .704
Altitude = 35 080 ft
C_L = .543
β = +0.3 deg
α_B = 3.71 deg
$N_{1_{E2}}$ = 3477 r/min

NOTES:

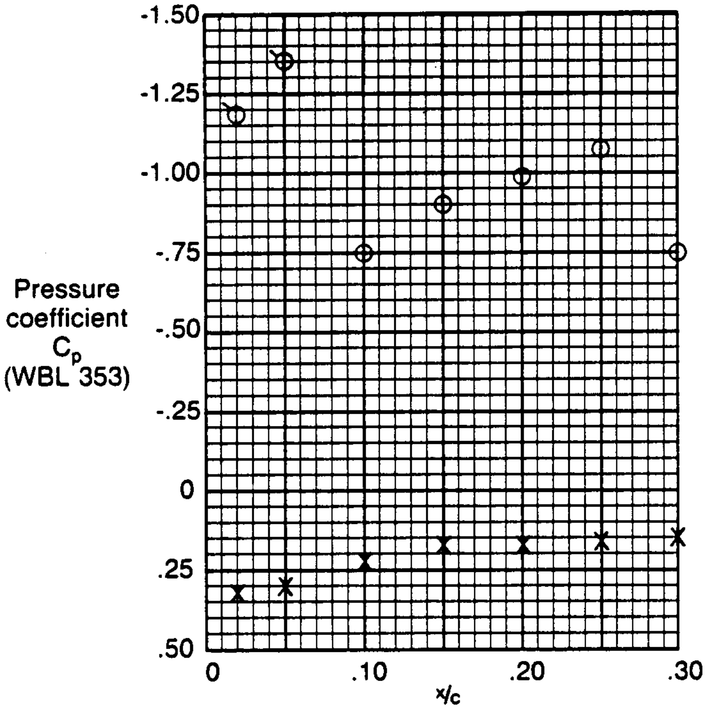
Pressure coefficients corrected using ΔP_{Port5}

Ɔ= Limited by transducer limit



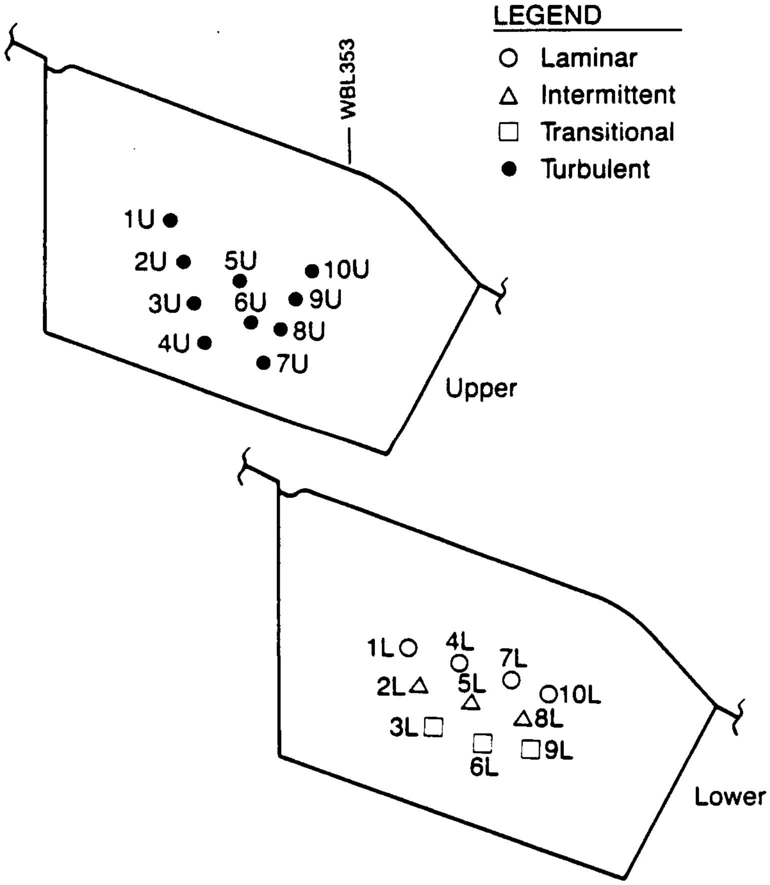
Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	45	36	57	4
2U	.20	47	38	59	3
3U	.25	61	51	75	5
4U	.30	69	57	88	5
5U	.20	62	51	75	4
6U	.25	69	55	91	5
7U	.30	69	53	86	6
8U	.25	66	51	83	6
9U	.20	55	43	68	5
10U	.15	48	39	64	4
Lower					
1L	.15	33	26	43	3
2L	.20	50	41	69	4
3L	.25	53	44	65	4
4L	.15	118	34	355	71
5L	.20	26	21	32	2
6L	.25	45	35	56	4
7L	.15	41	32	54	4
8L	.20	45	33	61	4
9L	.235	58	40	74	6
10L	.15	502	330	796	81

Figure 6-81. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.010



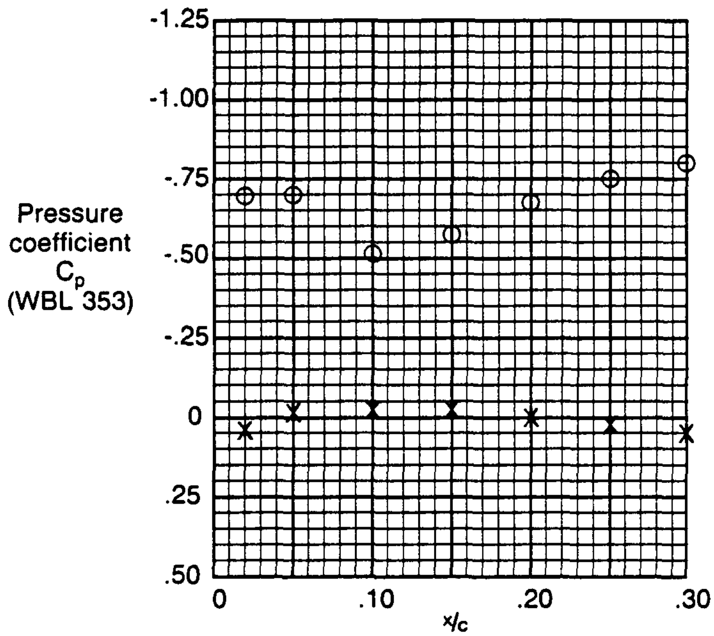
Mach No. = .698
Altitude = 35 080 ft
C_L = .553
β = +6.7 deg
α_B = 4.86 deg
$N_{1_{E2}}$ = 3628 r/min

NOTES:
Pressure coefficients corrected using ΔP_{Port5}
Ꝺ= Data limited by transducer limit



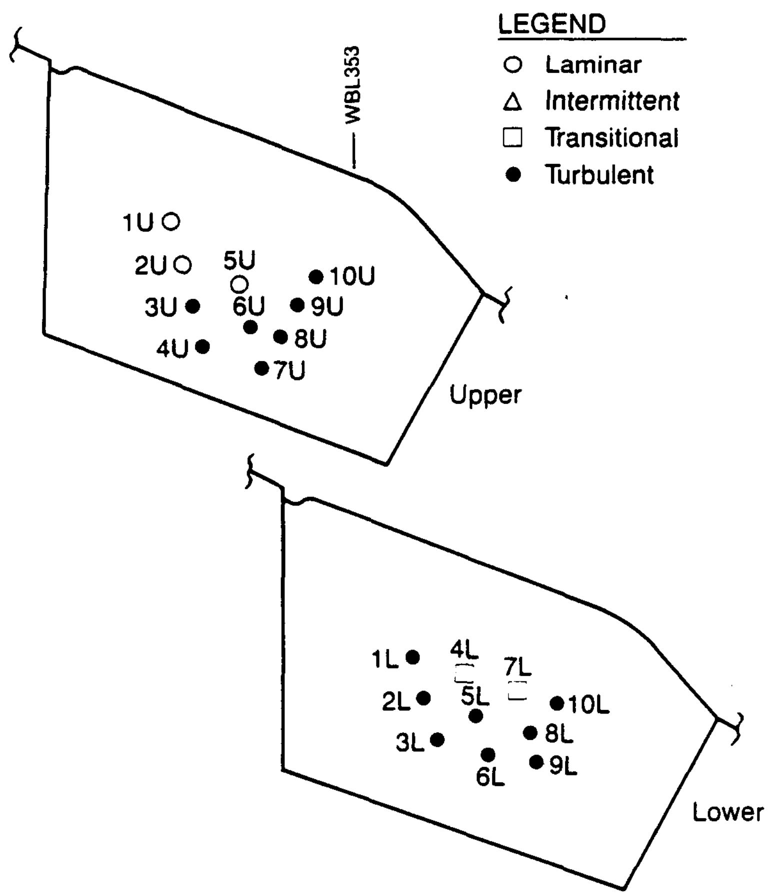
Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	55	40	87	8
2U	.20	51	41	61	4
3U	.25	60	48	76	5
4U	.30	75	59	94	7
5U	.20	62	51	78	5
6U	.25	62	50	77	5
7U	.30	74	48	96	8
8U	.25	58	47	76	5
9U	.20	62	45	86	5
10U	.15	52	41	66	5
Lower					
1L	.15	10	5	21	3
2L	.20	165	13	589	166
3L	.25	105	33	560	131
4L	.15	9	8	14	1
5L	.20	11	8	110	12
6L	.25	235	32	466	121
7L	.15	11	7	24	3
8L	.20	182	8	585	213
9L	.235	141	39	671	135
10L	.15	9	7	12	1

Figure 6-82. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.011



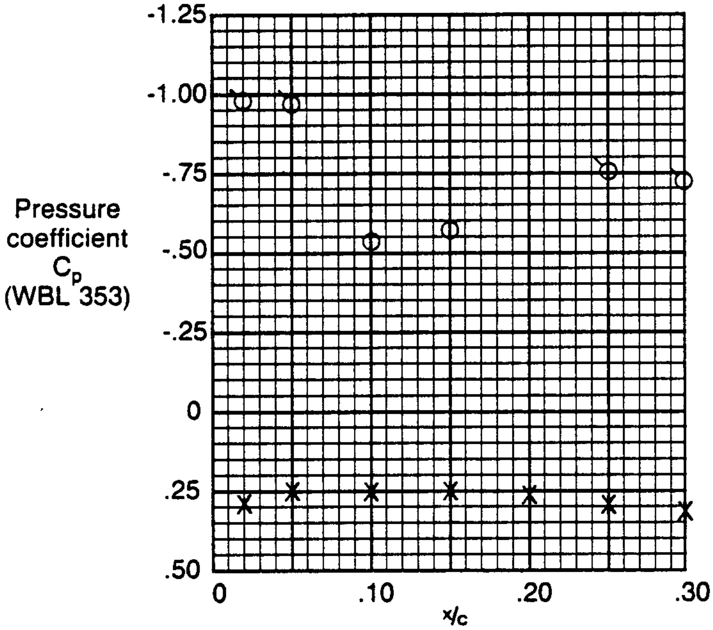
Mach No. = .799
Altitude = 36 588 ft
C_L = .451
β = +0.1 deg
α_B = 2.39 deg
$N_{1_{E2}}$ = 3631 r/min

NOTES:
Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	6	0
2U	.20	6	5	6	1
3U	.25	25	16	62	5
4U	.30	37	30	44	2
5U	.20	8	8	9	1
6U	.25	39	33	48	2
7U	.30	41	33	53	3
8U	.25	41	33	53	3
9U	.20	40	33	54	3
10U	.15	38	31	47	3
Lower					
1L	.15	34	25	44	3
2L	.20	46	35	66	4
3L	.25	45	37	57	4
4L	.15	61	18	240	36
5L	.20	24	20	30	2
6L	.25	40	32	53	3
7L	.15	490	259	677	73
8L	.20	41	33	53	3
9L	.235	53	41	71	5
10L	.15	39	31	49	3

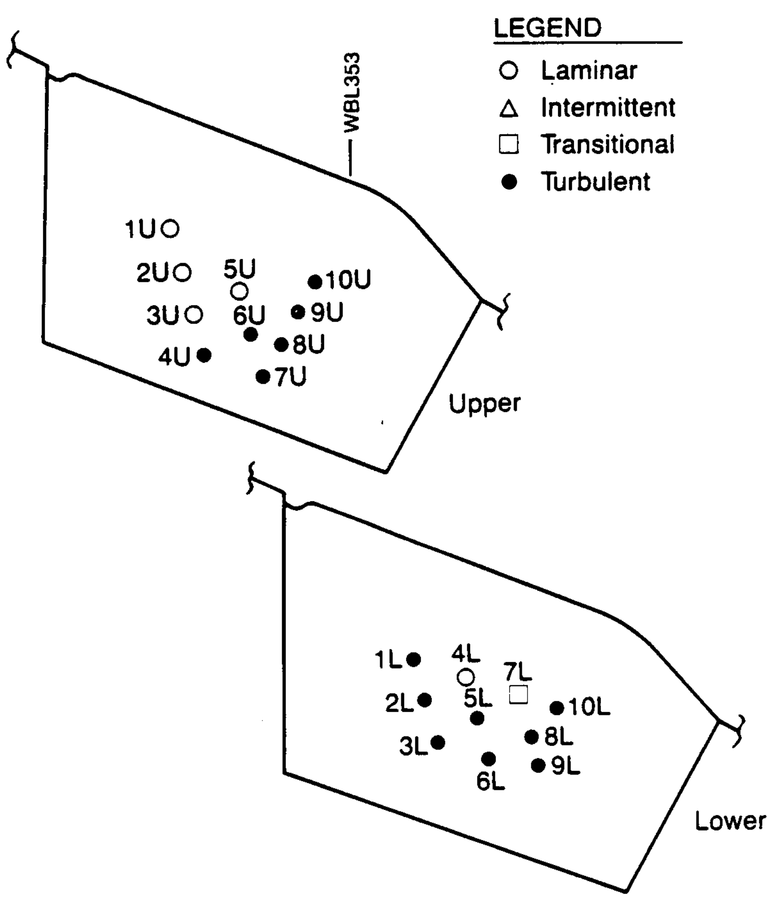
Figure 6-83. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.012



Mach No. = .801
Altitude = 38 035 ft
C_L = .479
β = +0.1 deg
α_B = 2.55 deg
$N_{1_{E2}}$ = 3649 r/min

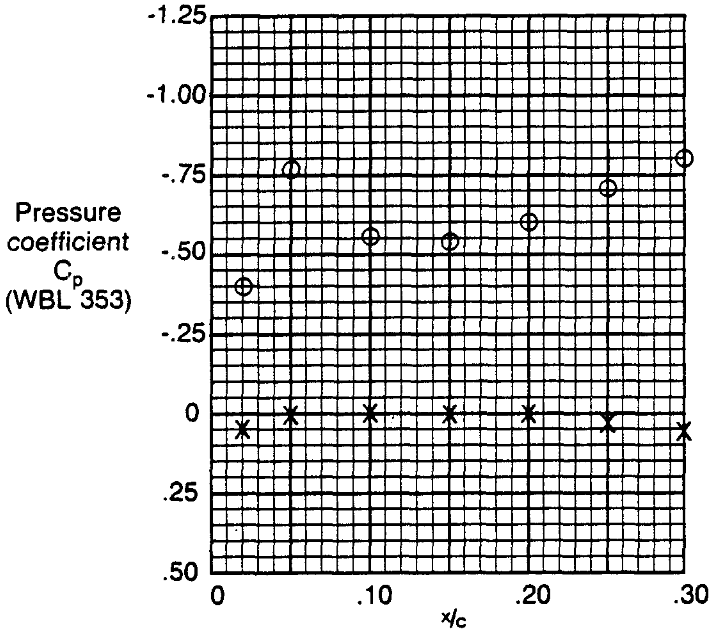
NOTES:

Pressure coefficients corrected using ΔP_{Port5}
Ɔ = Pressure limited by transducer limit



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	6	0
2U	.20	5	5	6	1
3U	.25	10	9	12	1
4U	.30	38	32	47	3
5U	.20	8	8	9	0
6U	.25	39	34	45	2
7U	.30	42	34	52	3
8U	.25	41	32	53	3
9U	.20	38	30	47	3
10U	.15	38	31	48	3
Lower					
1L	.15	43	31	164	14
2L	.20	51	37	150	10
3L	.25	44	36	56	4
4L	.15	17	13	32	2
5L	.20	24	20	31	2
6L	.25	39	30	48	3
7L	.15	518	394	659	49
8L	.20	40	33	51	3
9L	.235	52	40	70	5
10L	.15	39	32	50	3

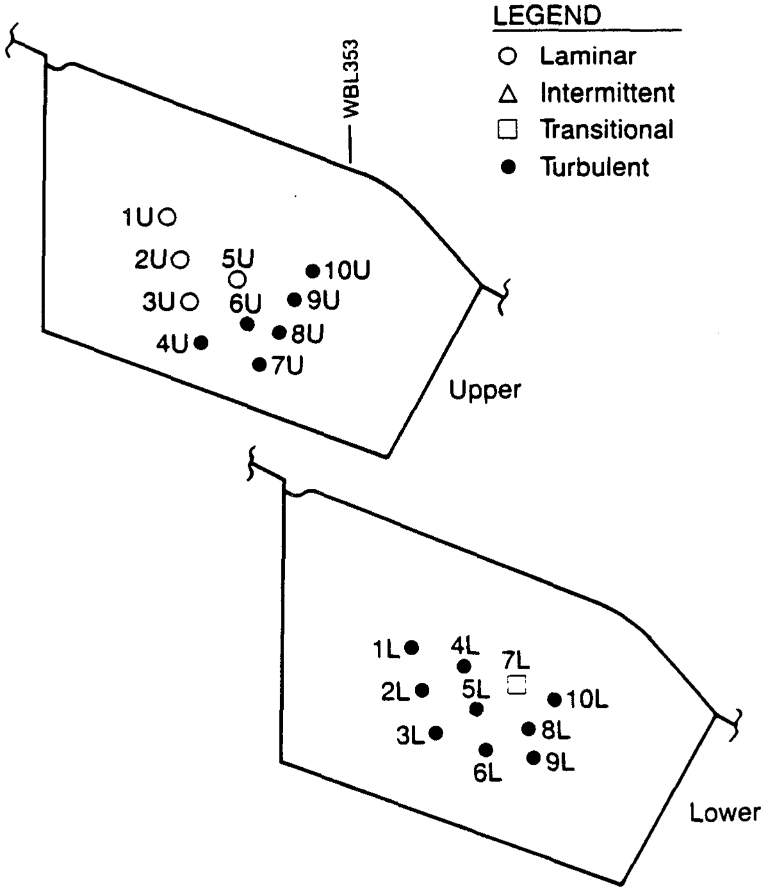
Figure 6-84. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.013



Mach No. = .823
Altitude = 39 863 ft
C_L = .492
β = +0.1 deg
α_B = 2.43 deg
$N_{1_{E2}}$ = 3919 r/min

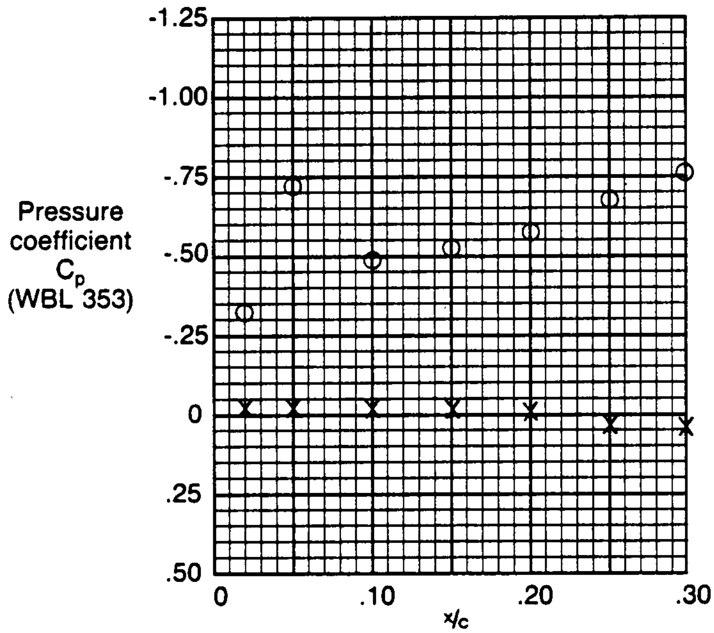
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	6	5	11	1
2U	.20	6	5	7	0
3U	.25	8	7	11	1
4U	.30	42	36	61	4
5U	.20	8	8	9	0
6U	.25	43	32	80	6
7U	.30	35	27	44	3
8U	.25	34	28	43	3
9U	.20	36	30	45	3
10U	.15	38	30	49	3
Lower					
1L	.15	38	26	116	10
2L	.20	44	36	61	4
3L	.25	43	34	53	3
4L	.15	24	16	85	9
5L	.20	23	19	29	2
6L	.25	37	30	47	3
7L	.15	486	321	612	50
8L	.20	39	32	50	3
9L	.235	50	38	66	5
10L	.15	37	30	48	3

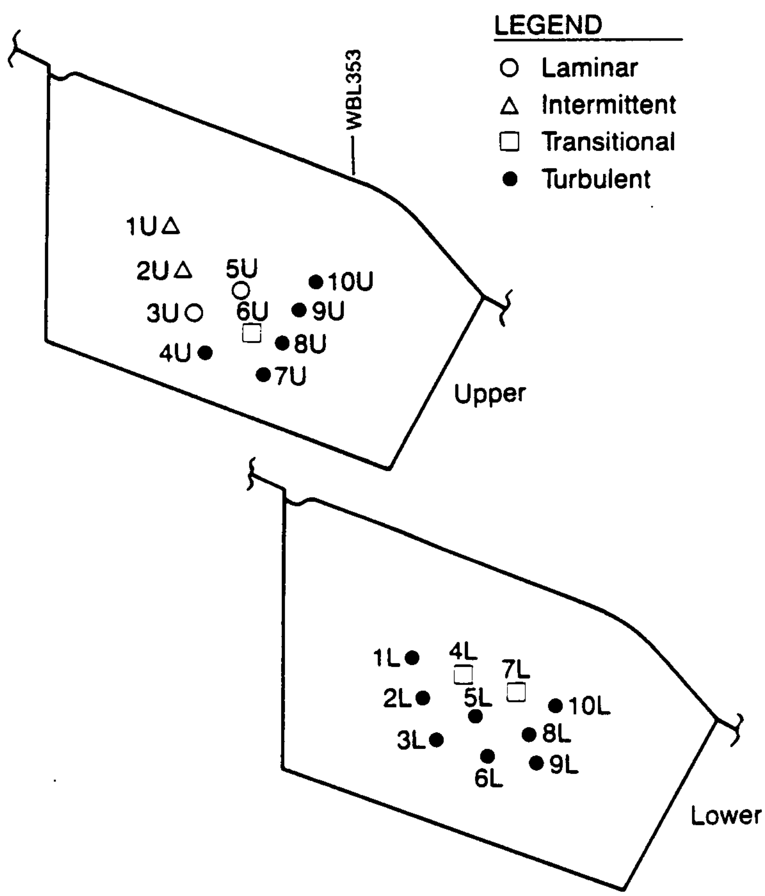
Figure 6-85. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.014



Mach No. = .834
Altitude = 39 862 ft
C_L = .480
β = +0.1 deg
α_B = 2.35 deg
$N_{1_{E2}}$ = 3945 r/min

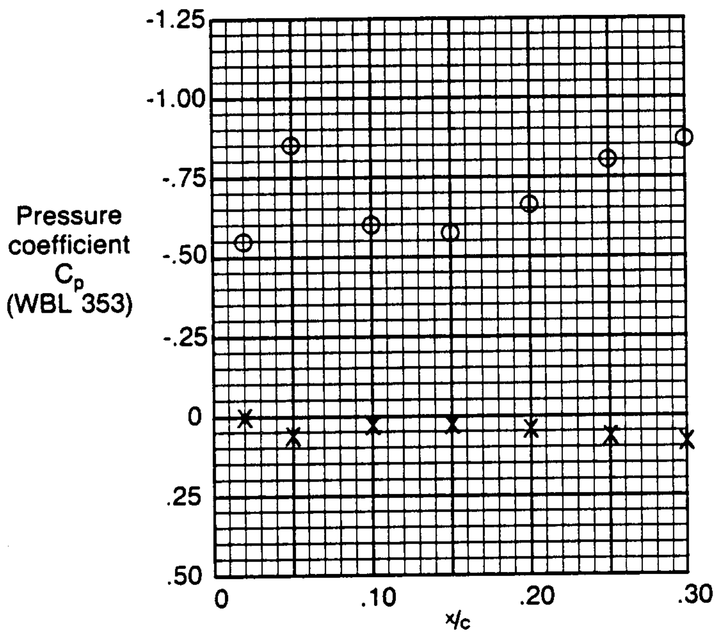
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	11	6	287	22
2U	.20	27	5	272	37
3U	.25	9	7	121	9
4U	.30	44	35	75	5
5U	.20	8	8	9	0
6U	.25	123	49	233	33
7U	.30	34	28	42	3
8U	.25	37	28	53	4
9U	.20	47	29	83	11
10U	.15	35	28	43	3
Lower					
1L	.15	40	31	125	6
2L	.20	47	36	61	4
3L	.25	44	36	53	3
4L	.15	40	18	139	21
5L	.20	22	18	26	1
6L	.25	37	30	47	3
7L	.15	251	73	532	81
8L	.20	39	30	50	3
9L	.235	50	38	70	5
10L	.15	38	32	46	3

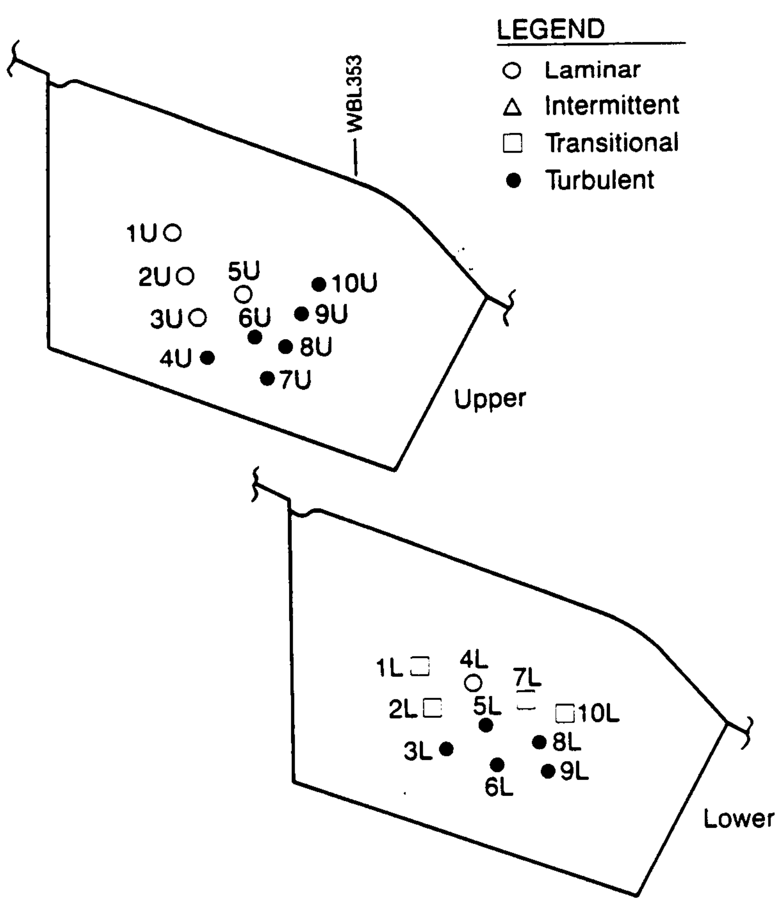
Figure 6-86. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.015



Mach No. = .802
Altitude = 40 480 ft
C_L = .530
β = +0.4 deg
α_B = 2.84 deg
$N_{1_{E2}}$ = 3964 r/min

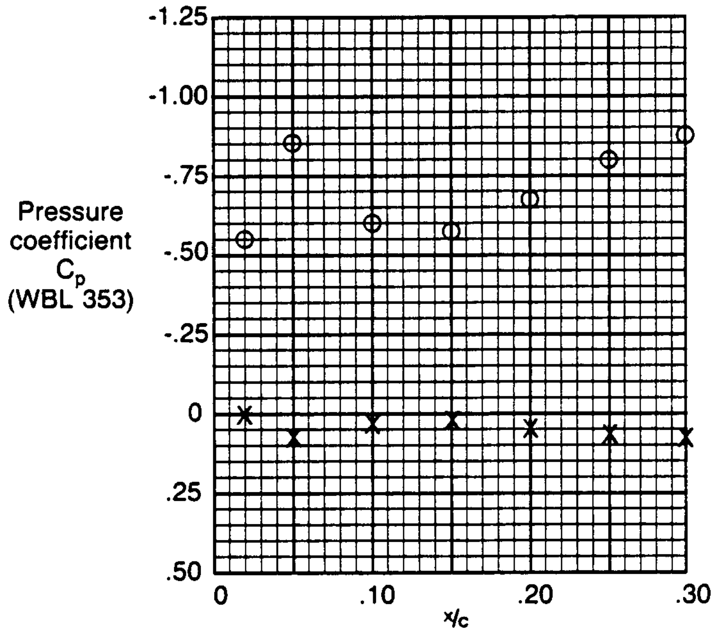
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	5	0
2U	.20	5	5	6	1
3U	.25	7	6	7	0
4U	.30	37	31	43	2
5U	.20	8	8	9	1
6U	.25	36	30	43	2
7U	.30	37	28	47	3
8U	.25	38	30	47	3
9U	.20	37	30	44	3
10U	.15	36	29	46	3
Lower					
1L	.15	426	299	519	35
2L	.20	50	35	180	18
3L	.25	39	31	47	3
4L	.15	14	12	16	1
5L	.20	25	19	46	4
6L	.25	34	27	42	2
7L	.15	79	26	247	45
8L	.20	38	31	47	3
9L	.235	46	36	63	4
10L	.15	171	58	397	62

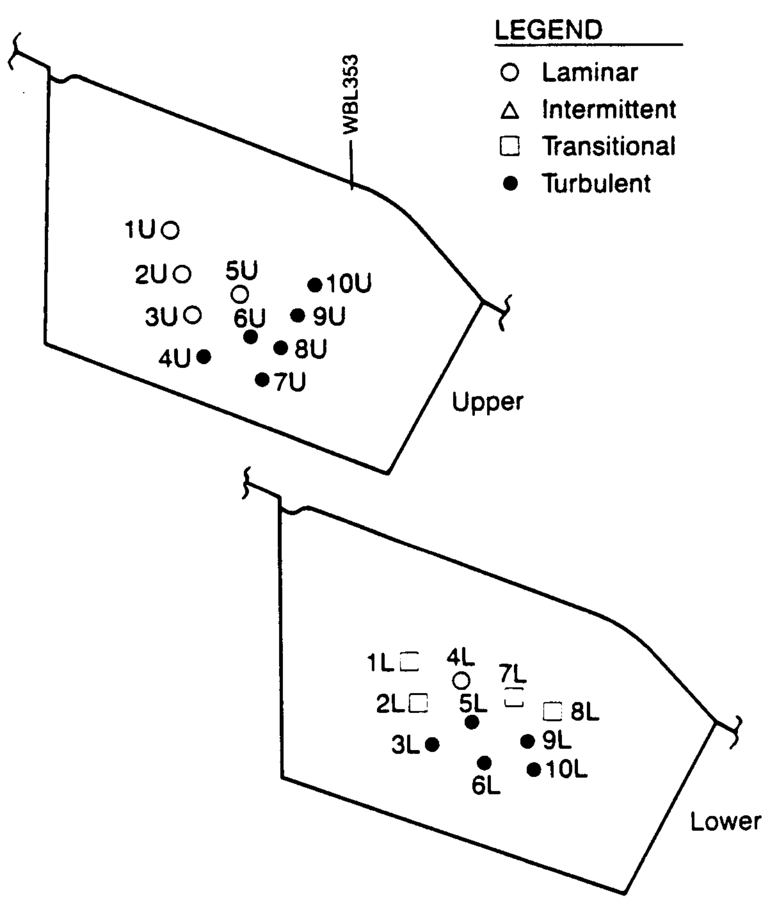
Figure 6-87. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.016



Mach No. = .802
Altitude = 40 419 ft
C_L = .529
β = +0.1 deg
α_B = 2.82 deg
$N_{1_{E2}}$ = 3795 r/min

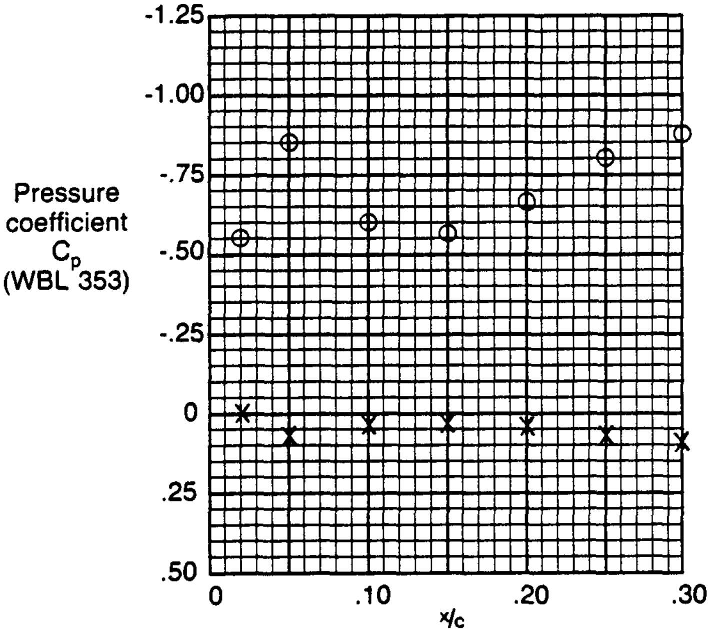
NOTES:

Pressures are from Flight 4



Hot film no.	$\frac{x}{c}$	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	5	0
2U	.20	5	5	6	1
3U	.25	7	6	9	0
4U	.30	37	31	44	2
5U	.20	8	8	9	0
6U	.25	36	29	44	2
7U	.30	37	29	47	3
8U	.25	38	30	48	3
9U	.20	36	30	44	3
10U	.15	37	29	50	3
Lower					
1L	.15	421	284	559	41
2L	.20	52	33	142	17
3L	.25	39	32	48	3
4L	.15	13	11	15	1
5L	.20	24	19	82	5
6L	.25	34	28	45	2
7L	.15	81	19	275	46
8L	.20	37	29	48	3
9L	.235	46	35	63	4
10L	.15	183	38	442	73

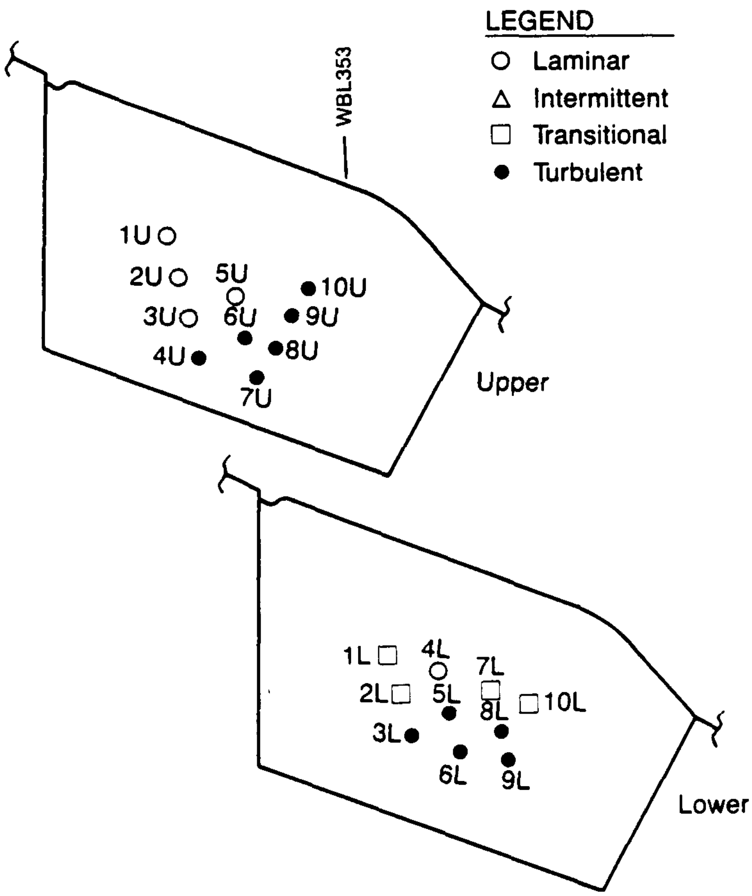
Figure 6-88. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.017



Mach No. = .805
Altitude = 40 477 ft
C_L = .525
β = 0.0 deg
α_B = 2.78 deg
$N_{1_{E2}}$ = 3653 r/min

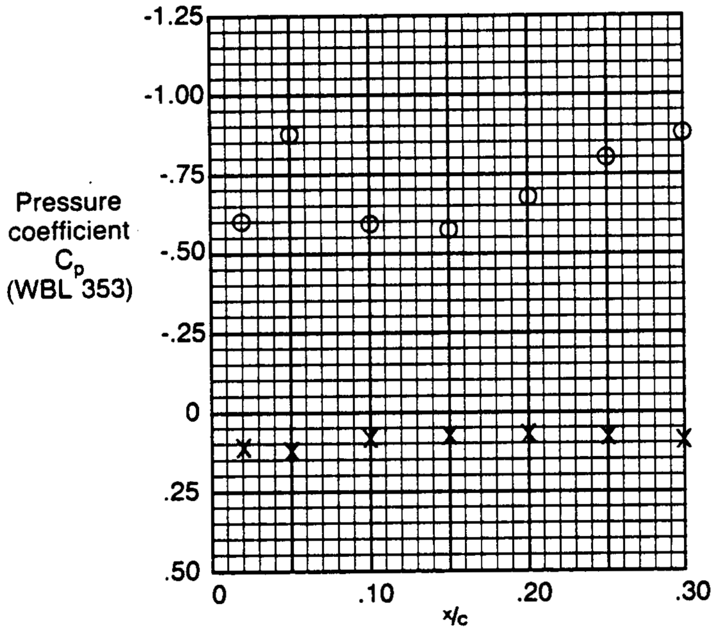
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	5	0
2U	.20	5	5	6	0
3U	.25	7	6	9	0
4U	.30	38	32	46	3
5U	.20	8	8	9	1
6U	.25	36	30	42	2
7U	.30	36	29	45	3
8U	.25	37	30	47	3
9U	.20	36	30	42	3
10U	.15	38	31	49	3
Lower					
1L	.15	429	304	551	40
2L	.20	68	37	213	28
3L	.25	39	32	49	3
4L	.15	14	12	16	1
5L	.20	24	19	62	5
6L	.25	34	28	41	2
7L	.15	78	19	272	43
8L	.20	37	30	47	3
9L	.235	46	36	61	4
10L	.15	127	44	338	54

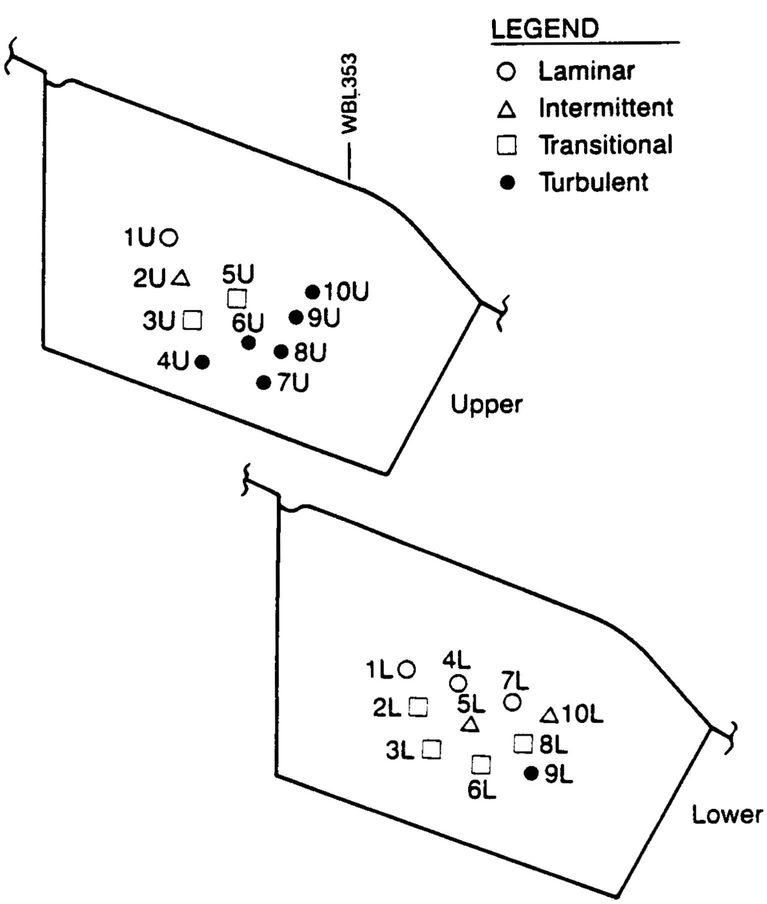
Figure 6-89. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.018



Mach No. = .797
Altitude = 40 544 ft
C_L = .537
β = +4.0 deg
α_B = 3.40 deg
$N_{1_{E2}}$ = 3661 r/min

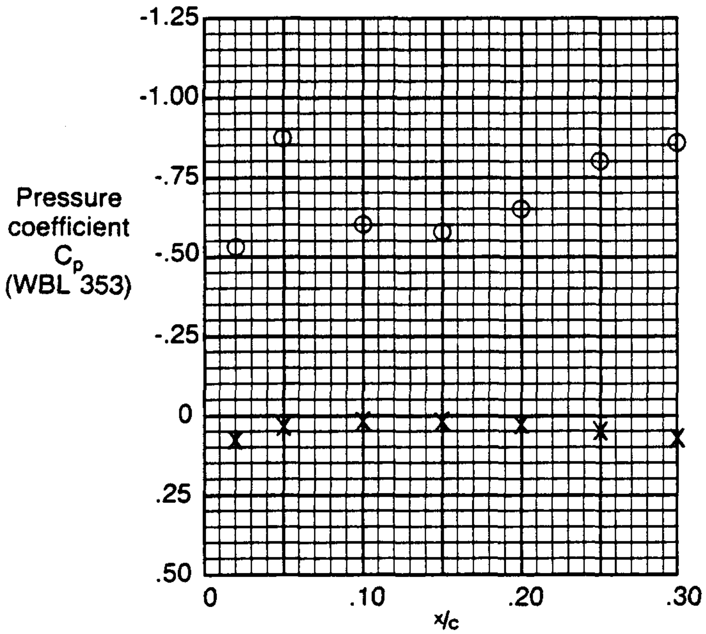
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	7	5	10	1
2U	.20	121	5	392	135
3U	.25	130	35	365	89
4U	.30	42	33	50	3
5U	.20	106	34	499	112
6U	.25	43	36	51	3
7U	.30	40	33	52	3
8U	.25	41	31	51	3
9U	.20	38	32	54	3
10U	.15	38	29	47	3
Lower					
1L	.15	12	10	20	2
2L	.20	24	20	131	9
3L	.25	117	37	322	63
4L	.15	12	10	14	1
5L	.20	38	10	200	43
6L	.25	43	31	200	18
7L	.15	13	11	15	1
8L	.20	309	39	515	108
9L	.235	45	34	76	5
10L	.15	37	11	417	69

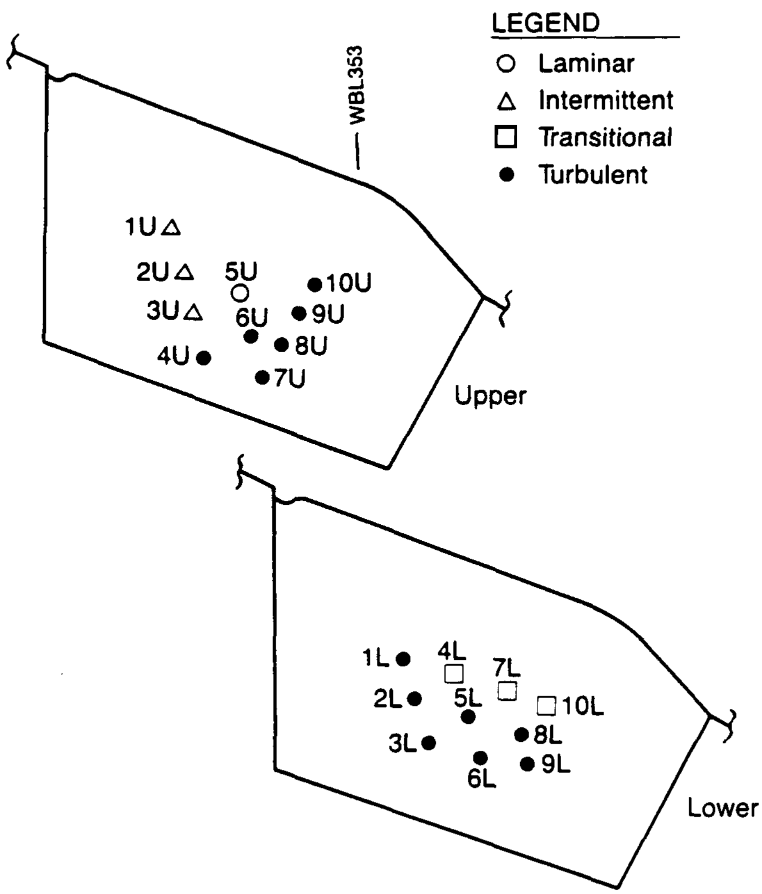
Figure 6-90. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.019



Mach No. = .792
Altitude = 40 443 ft
C_L = .540
β = -4.1 deg
α_B = 3.57 deg
$N_{1_{E2}}$ = 3661 r/min

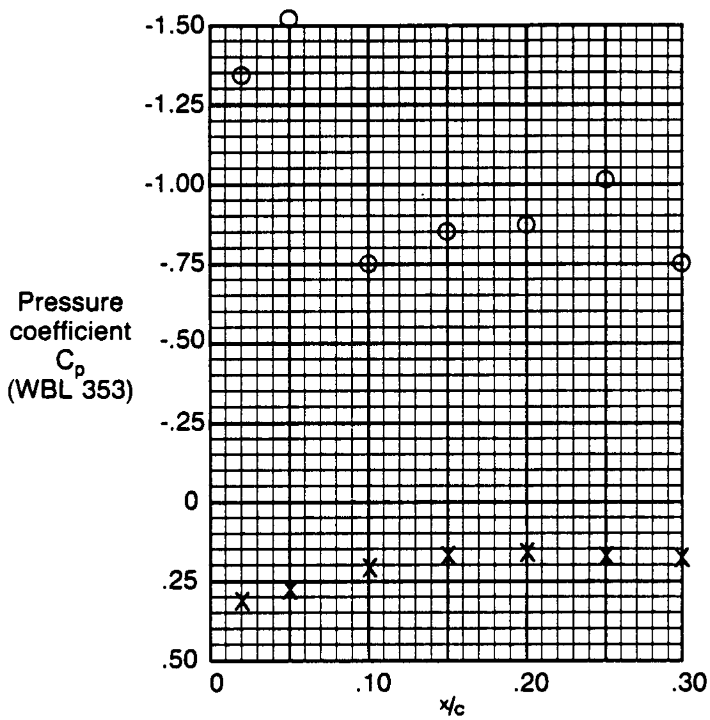
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	20	5	424	55
2U	.20	26	5	345	62
3U	.25	18	7	284	40
4U	.30	39	31	64	4
5U	.20	9	8	31	3
6U	.25	39	32	77	6
7U	.30	38	29	46	3
8U	.25	38	30	52	3
9U	.20	38	30	59	3
10U	.15	36	29	45	3
Lower					
1L	.15	33	25	76	5
2L	.20	46	36	56	4
3L	.25	47	38	58	4
4L	.15	413	172	552	74
5L	.20	26	20	59	5
6L	.25	37	31	45	2
7L	.15	402	110	653	104
8L	.20	41	30	72	5
9L	.235	52	40	76	6
10L	.15	78	33	402	65

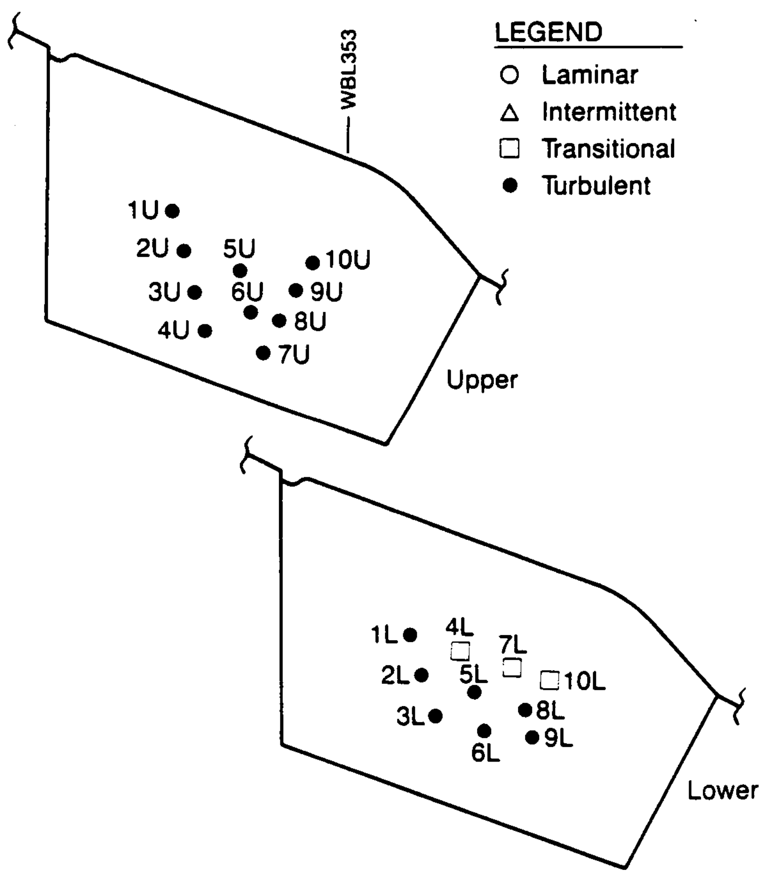
Figure 6-91. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.020



Mach No. = .703
Altitude = 39 137 ft
C_L = .640
β = +0.9 deg
α_B = 4.55 deg
$N_{1_{E2}}$ = 4056 r/min

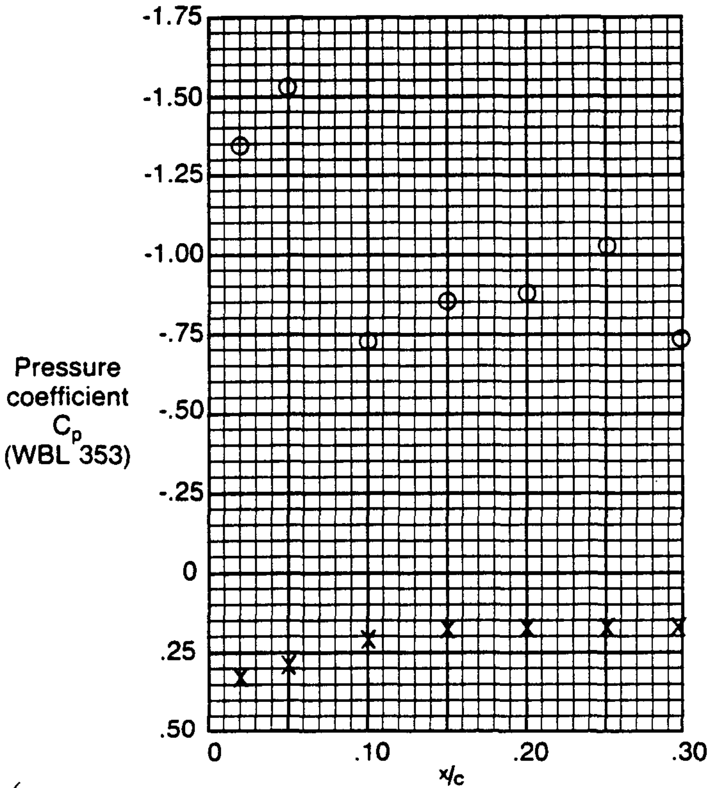
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	60	45	78	6
2U	.20	46	38	59	3
3U	.25	56	48	69	4
4U	.30	62	49	74	5
5U	.20	58	47	74	4
6U	.25	59	46	71	4
7U	.30	57	44	74	5
8U	.25	53	39	69	5
9U	.20	50	39	61	4
10U	.15	47	38	59	4
Lower					
1L	.15	33	25	41	3
2L	.20	45	37	58	4
3L	.25	48	39	64	4
4L	.15	182	20	428	110
5L	.20	24	20	30	2
6L	.25	41	32	50	3
7L	.15	85	29	336	72
8L	.20	43	37	55	4
9L	.235	53	36	66	5
10L	.15	243	26	544	135

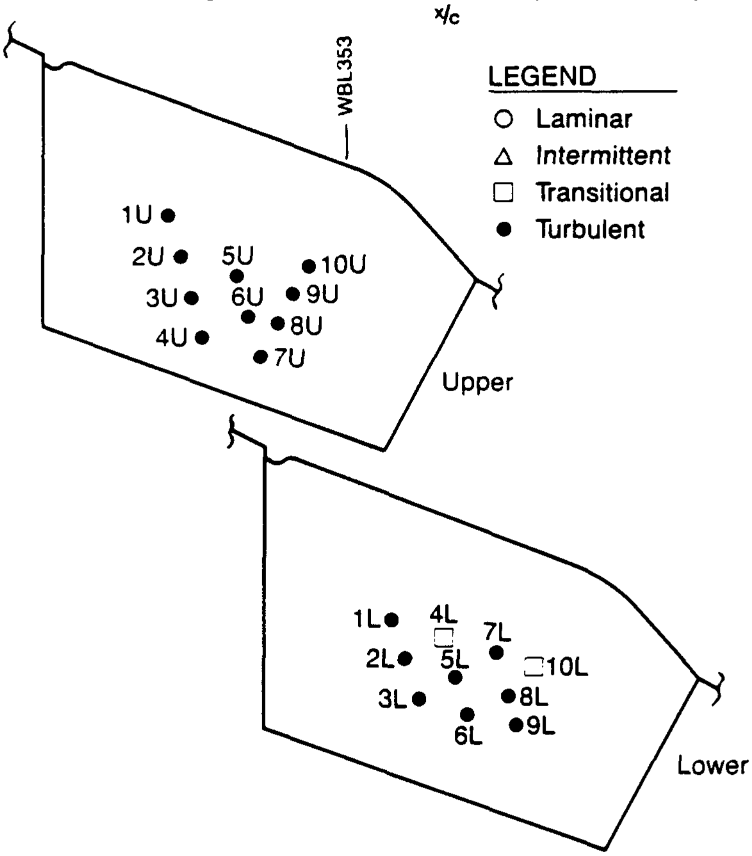
Figure 6-92. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.021



Mach No. = .700
Altitude = 39 128 ft
C_L = .647
β = +0.4 deg
α_B = 4.66 deg
$N_{1_{E2}}$ = 3667 r/min

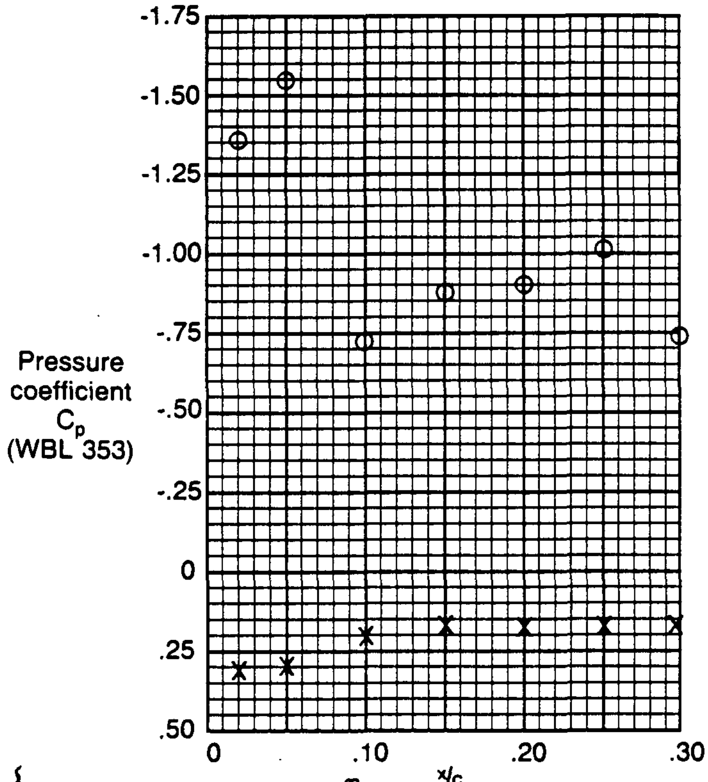
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	51	41	68	4
2U	.20	47	39	56	3
3U	.25	56	46	69	4
4U	.30	65	53	78	5
5U	.20	58	49	68	4
6U	.25	58	50	73	4
7U	.30	70	56	94	6
8U	.25	52	41	69	4
9U	.20	49	41	63	4
10U	.15	49	40	60	4
Lower					
1L	.15	34	25	43	3
2L	.20	35	37	57	3
3L	.25	49	40	66	4
4L	.15	297	91	452	76
5L	.20	25	21	29	2
6L	.25	42	36	53	3
7L	.15	39	32	110	6
8L	.20	44	35	59	4
9L	.235	54	40	70	5
10L	.15	391	45	607	93

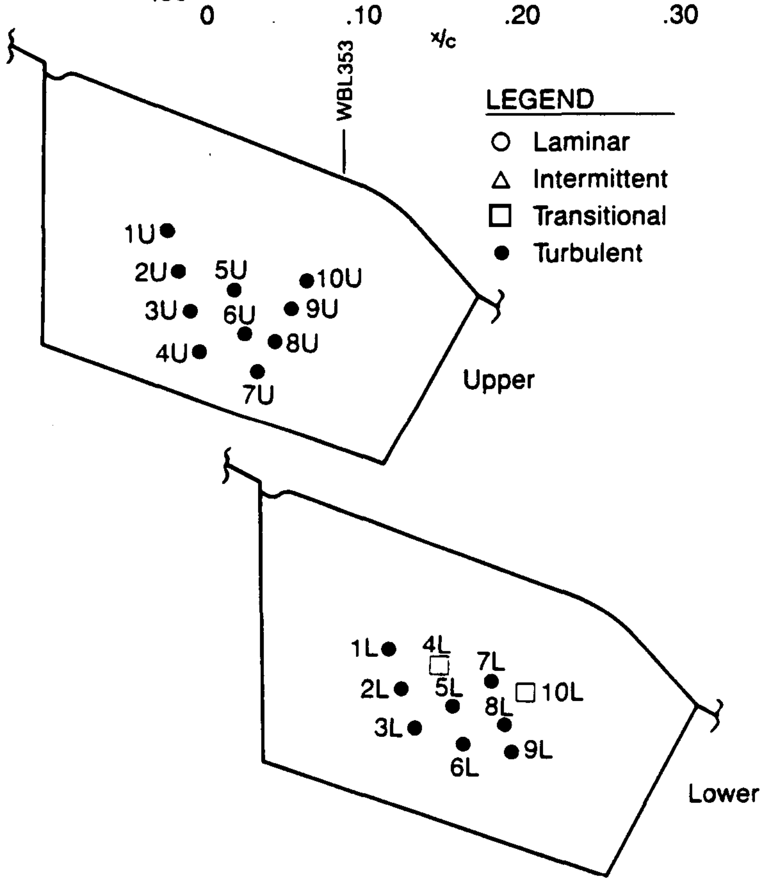
Figure 6-93. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.022



Mach No. = .695
Altitude = 39 190 ft
C_L = .655
β = -0.4 deg
α_B = 4.73 deg
$N_{1_{E2}}$ = 3068 r/min

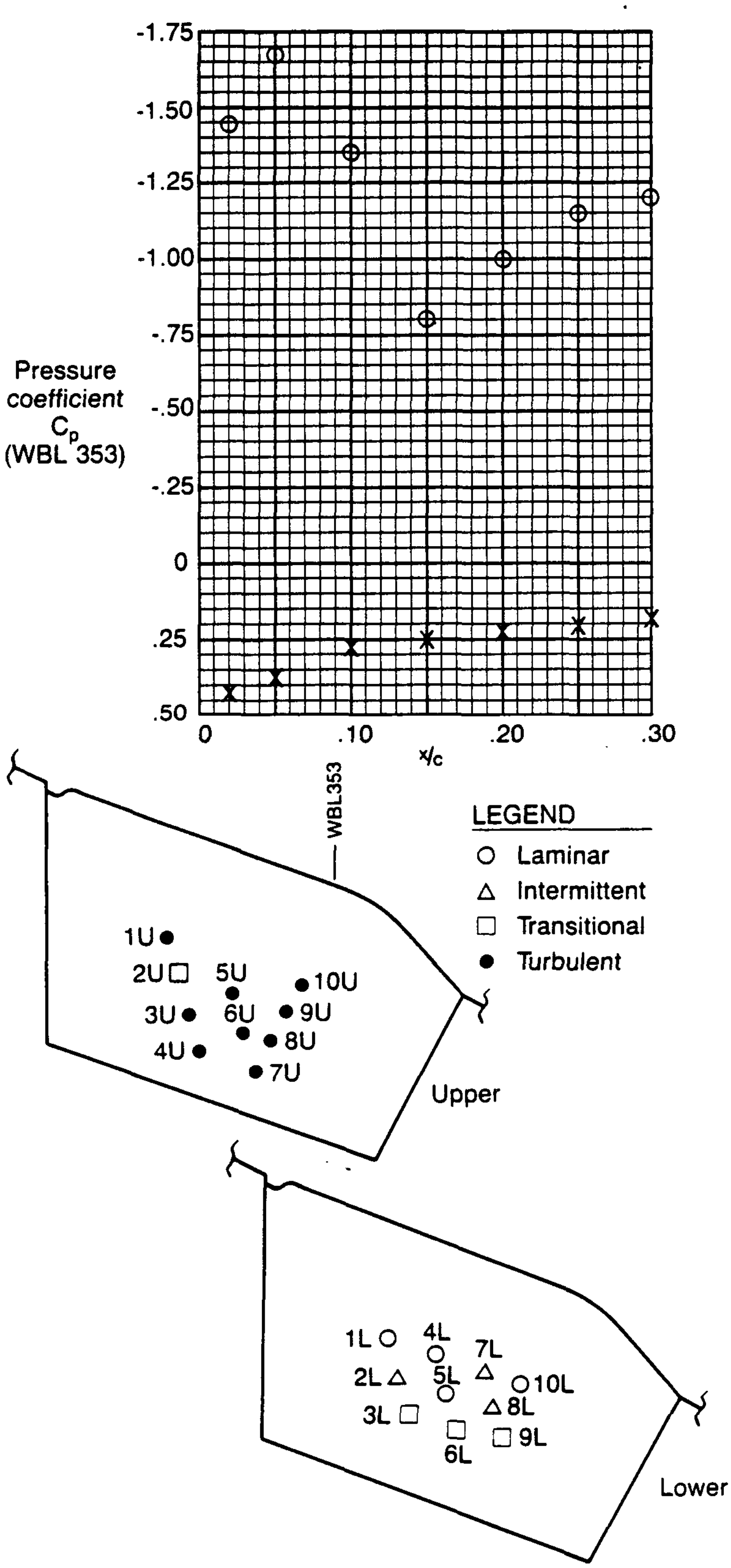
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	46	36	56	3
2U	.20	46	38	55	3
3U	.25	56	45	72	4
4U	.30	67	56	84	5
5U	.20	59	49	71	4
6U	.25	58	48	70	4
7U	.30	67	50	90	6
8U	.25	53	40	66	5
9U	.20	49	39	63	4
10U	.15	52	41	66	4
Lower					
1L	.15	34	28	50	3
2L	.20	46	37	58	4
3L	.25	50	38	67	4
4L	.15	62	30	270	32
5L	.20	23	19	28	2
6L	.25	42	35	51	3
7L	.15	39	31	52	3
8L	.20	45	35	59	4
9L	.235	57	44	74	5
10L	.15	70	25	645	97

Figure 6-94. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.023



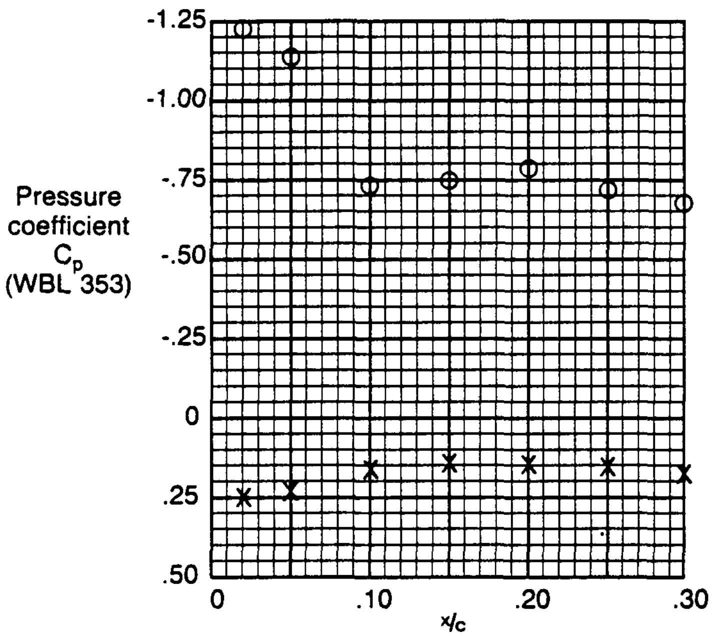
Mach No. = .692
Altitude = 39 180 ft
C_L = .660
β = +7.0 deg
α_B = 5.28 deg
$N_{1_{E2}}$ = 3502 r/min

NOTES:

Pressures are from Flight 4

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	36	30	44	3
2U	.20	64	33	112	21
3U	.25	64	51	84	6
4U	.30	63	50	77	5
5U	.20	63	48	85	5
6U	.25	62	47	75	5
7U	.30	59	48	88	5
8U	.25	55	45	75	5
9U	.20	51	37	63	5
10U	.15	64	43	86	8
Lower					
1L	.15	10	4	30	4
2L	.20	31	10	437	47
3L	.25	144	13	544	150
4L	.15	8	6	12	1
5L	.20	7	7	17	1
6L	.25	42	8	269	45
7L	.15	13	7	83	7
8L	.20	34	6	381	71
9L	.235	314	32	690	177
10L	.15	9	6	34	3

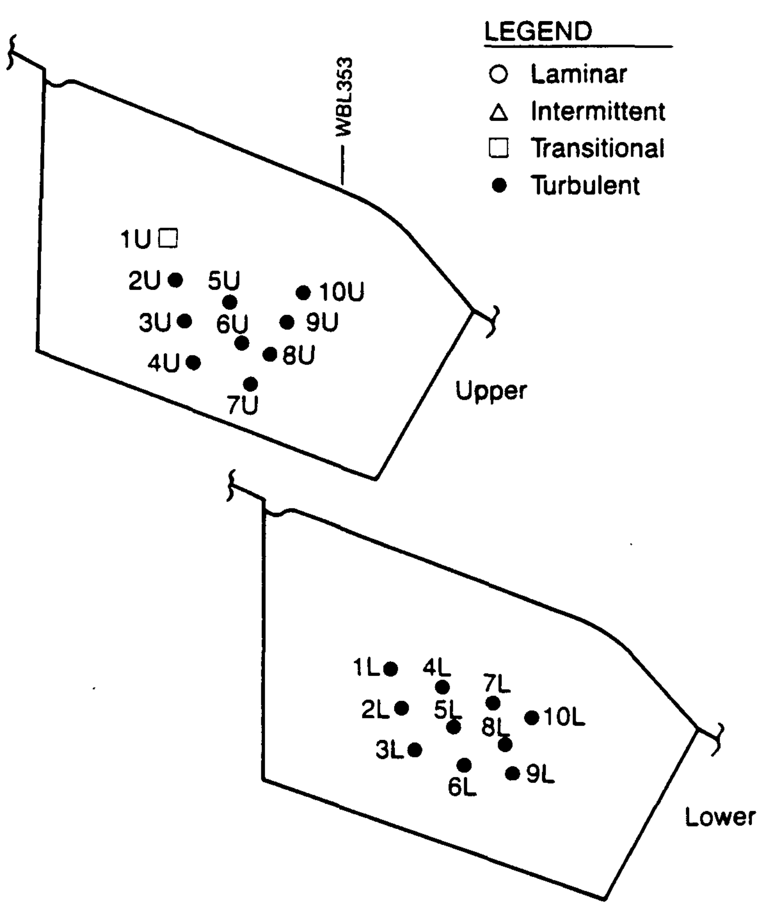
Figure 6-95. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.024



Mach No. = .719
Altitude = 39 075 ft
C_L = .608
β = -7.8 deg
α_B = 5.31 deg
$N_{1_{E2}}$ = 4037 r/min

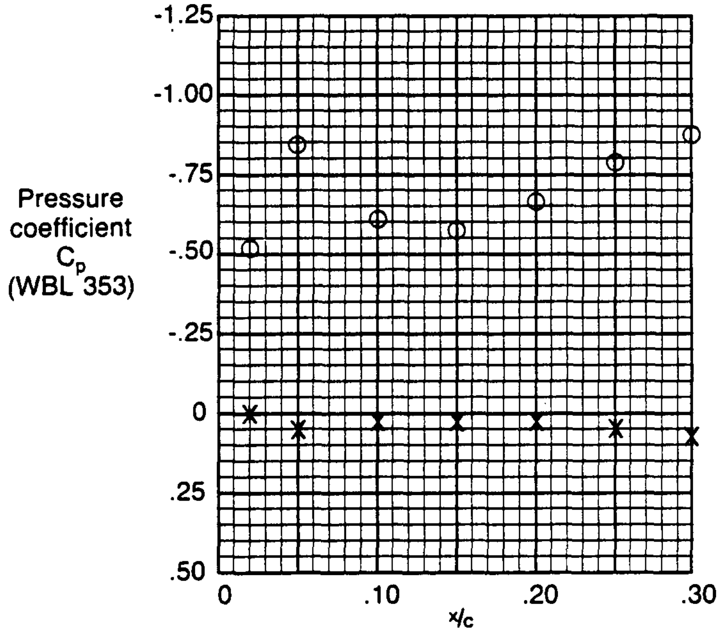
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	57	23	528	71
2U	.20	40	31	51	3
3U	.25	55	47	66	4
4U	.30	62	49	79	5
5U	.20	57	46	69	4
6U	.25	60	50	73	4
7U	.30	64	52	78	5
8U	.25	59	48	74	5
9U	.20	50	42	66	5
10U	.15	45	38	54	3
Lower					
1L	.15	38	31	48	3
2L	.20	55	44	73	5
3L	.25	55	40	70	5
4L	.15	42	33	53	4
5L	.20	29	25	35	2
6L	.25	45	38	55	3
7L	.15	49	39	63	4
8L	.20	51	41	63	4
9L	.235	62	50	77	6
10L	.15	49	35	60	4

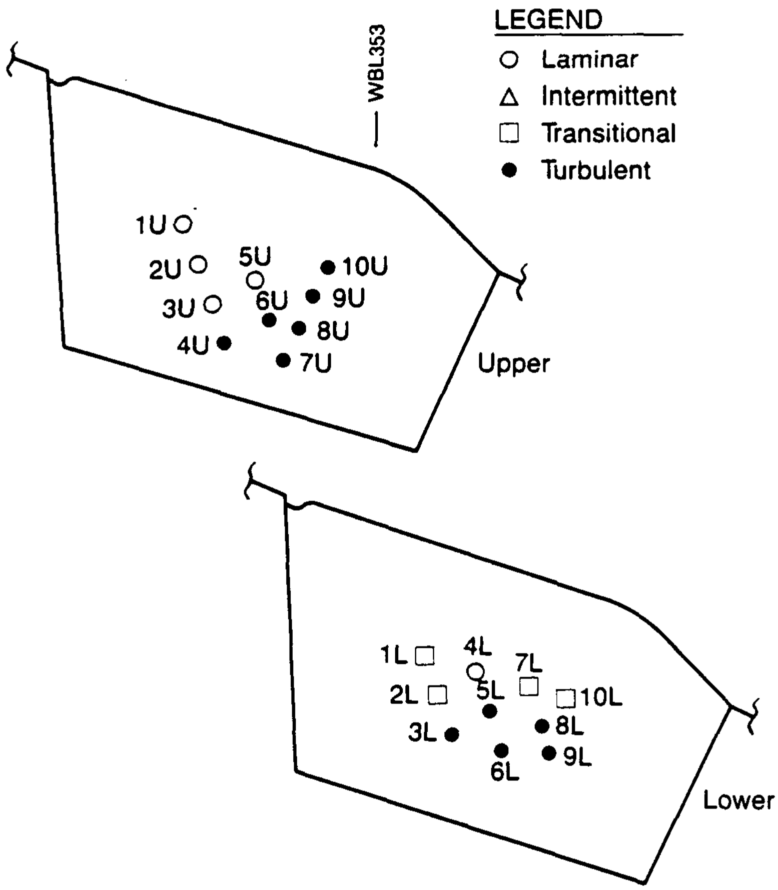
Figure 6-96. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.025



Mach No. = .801
Altitude = 39 092 ft
C_L = .494
β = +0.2 deg
α_B = 2.65 deg
$N_{1_{E2}}$ = 3708 r/min

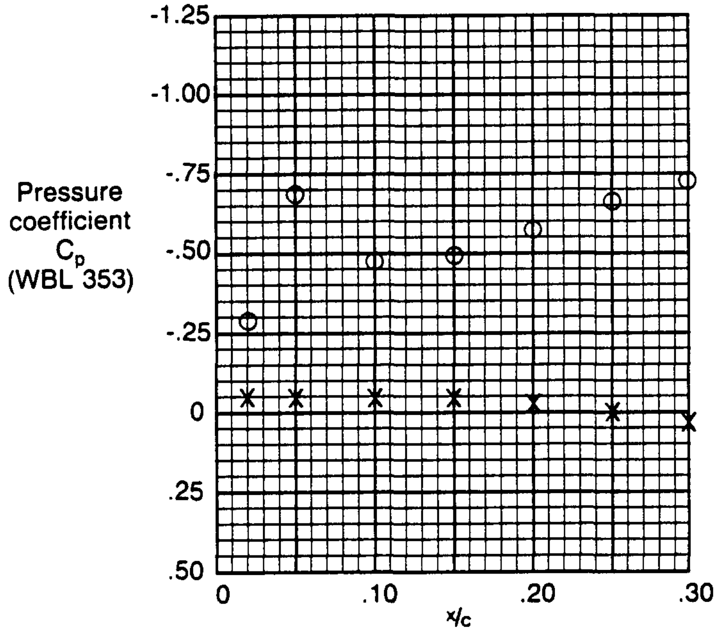
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	6	0
2U	.20	5	5	6	0
3U	.25	9	7	10	0
4U	.30	39	32	47	2
5U	.20	9	8	9	1
6U	.25	37	29	44	2
7U	.30	39	32	49	3
8U	.25	39	30	50	3
9U	.20	36	30	47	3
10U	.15	37	30	46	3
Lower					
1L	.15	339	171	494	67
2L	.20	73	38	203	29
3L	.25	40	33	52	3
4L	.15	15	13	18	1
5L	.20	24	20	46	3
6L	.25	36	30	42	2
7L	.15	184	72	354	57
8L	.20	38	31	47	3
9L	.235	48	37	61	5
10L	.15	48	33	129	15

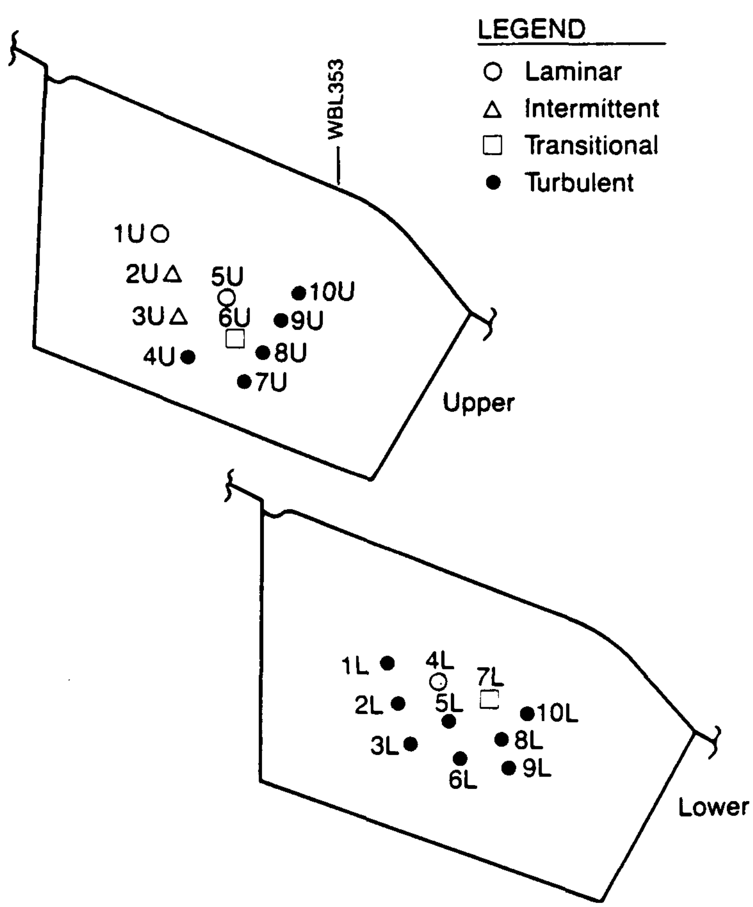
Figure 6-97. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.026



Mach No. = .821
Altitude = 38 440 ft
C_L = .451
β = +0.1 deg
α_B = 2.24 deg
$N_{1_{E2}}$ = 3754 r/min

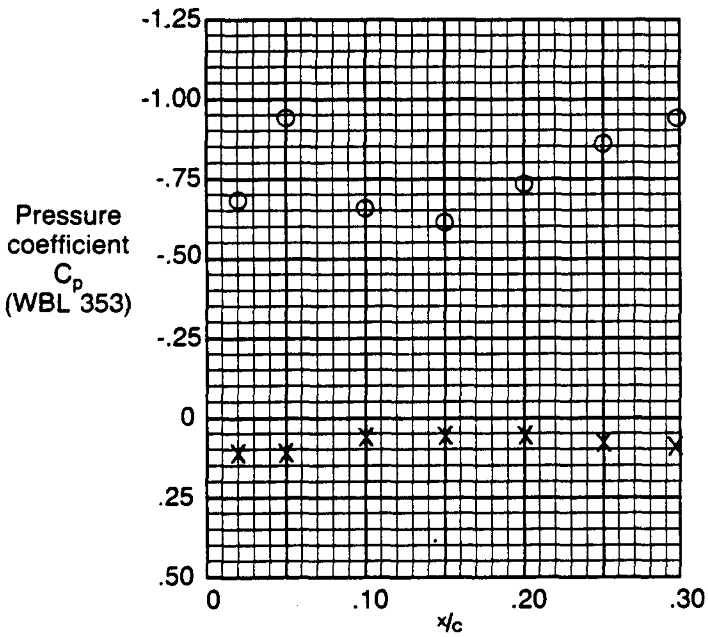
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	9	5	90	6
2U	.20	10	5	106	12
3U	.25	11	7	258	16
4U	.30	38	32	59	3
5U	.20	9	8	9	0
6U	.25	56	37	133	15
7U	.30	35	29	46	3
8U	.25	39	32	48	3
9U	.20	45	32	74	6
10U	.15	35	29	42	3
Lower					
1L	.15	42	32	146	10
2L	.20	46	37	58	4
3L	.25	42	35	54	4
4L	.15	17	14	25	1
5L	.20	22	18	26	2
6L	.25	38	32	58	3
7L	.15	490	332	630	56
8L	.20	38	30	47	3
9L	.235	50	38	64	5
10L	.15	37	31	49	3

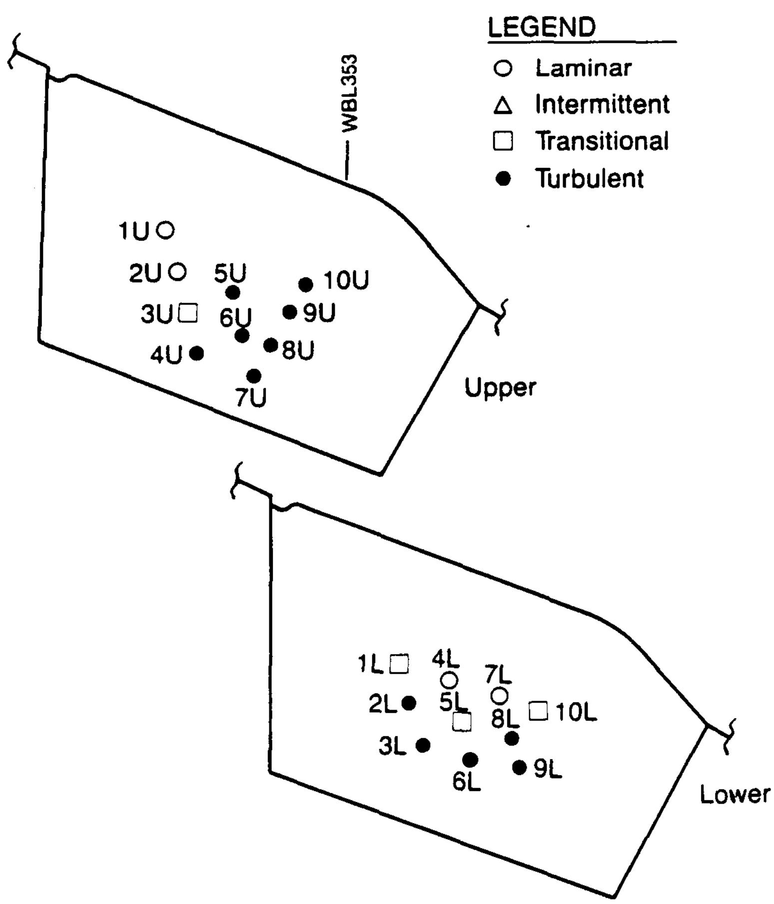
Figure 6-98. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.027



Mach No. = .778
Altitude = 39 646 ft
C_L = .531
β = +0.2 deg
α_B = 3.11 deg
$N_{1_{E2}}$ = 3681 r/min

NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	5	0
2U	.20	6	5	6	1
3U	.25	101	45	243	36
4U	.30	44	38	56	3
5U	.20	51	40	129	9
6U	.25	42	35	51	3
7U	.30	41	32	50	3
8U	.25	42	32	58	3
9U	.20	39	32	51	3
10U	.15	39	31	46	3
Lower					
1L	.15	286	67	498	78
2L	.20	43	33	96	8
3L	.25	40	33	48	3
4L	.15	12	10	14	1
5L	.20	71	31	151	23
6L	.25	34	28	41	2
7L	.15	14	12	27	1
8L	.20	35	29	42	3
9L	.235	35	34	59	4
10L	.15	256	96	452	72

Figure 6-99. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.028

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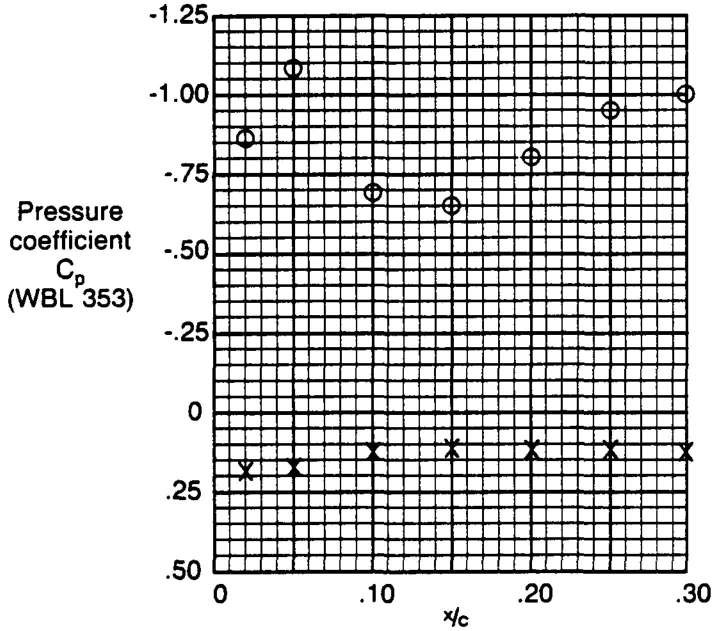
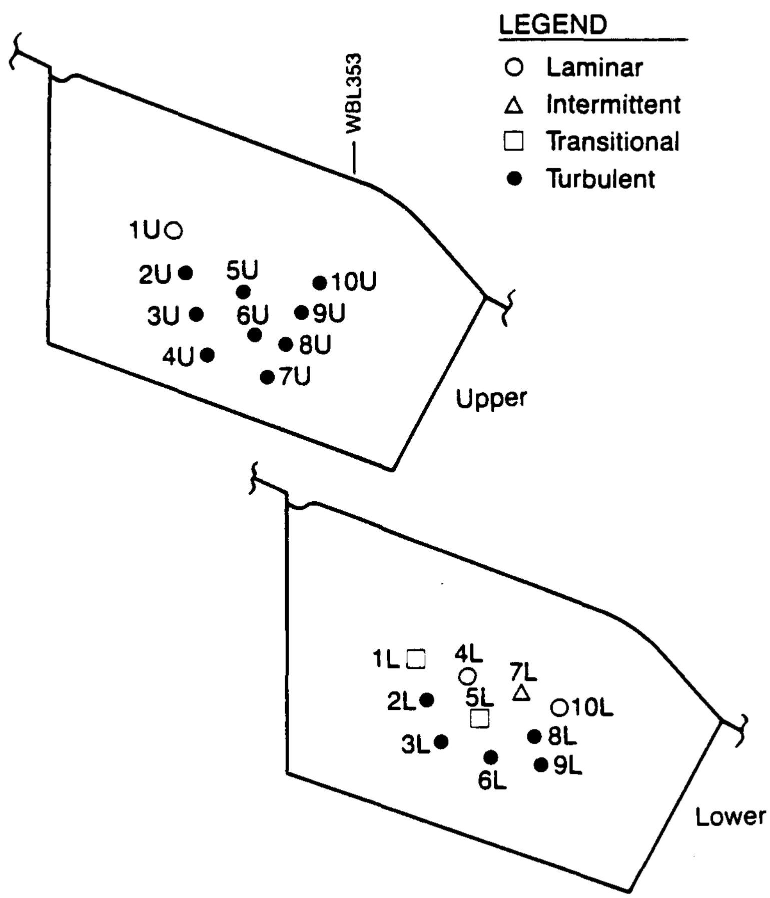


Mach No. = .752
Altitude = 39 661 ft
C_L = .567
β = +0.2 deg
α_B = 3.60 deg
$N_{1_{E2}}$ = 3638 r/min

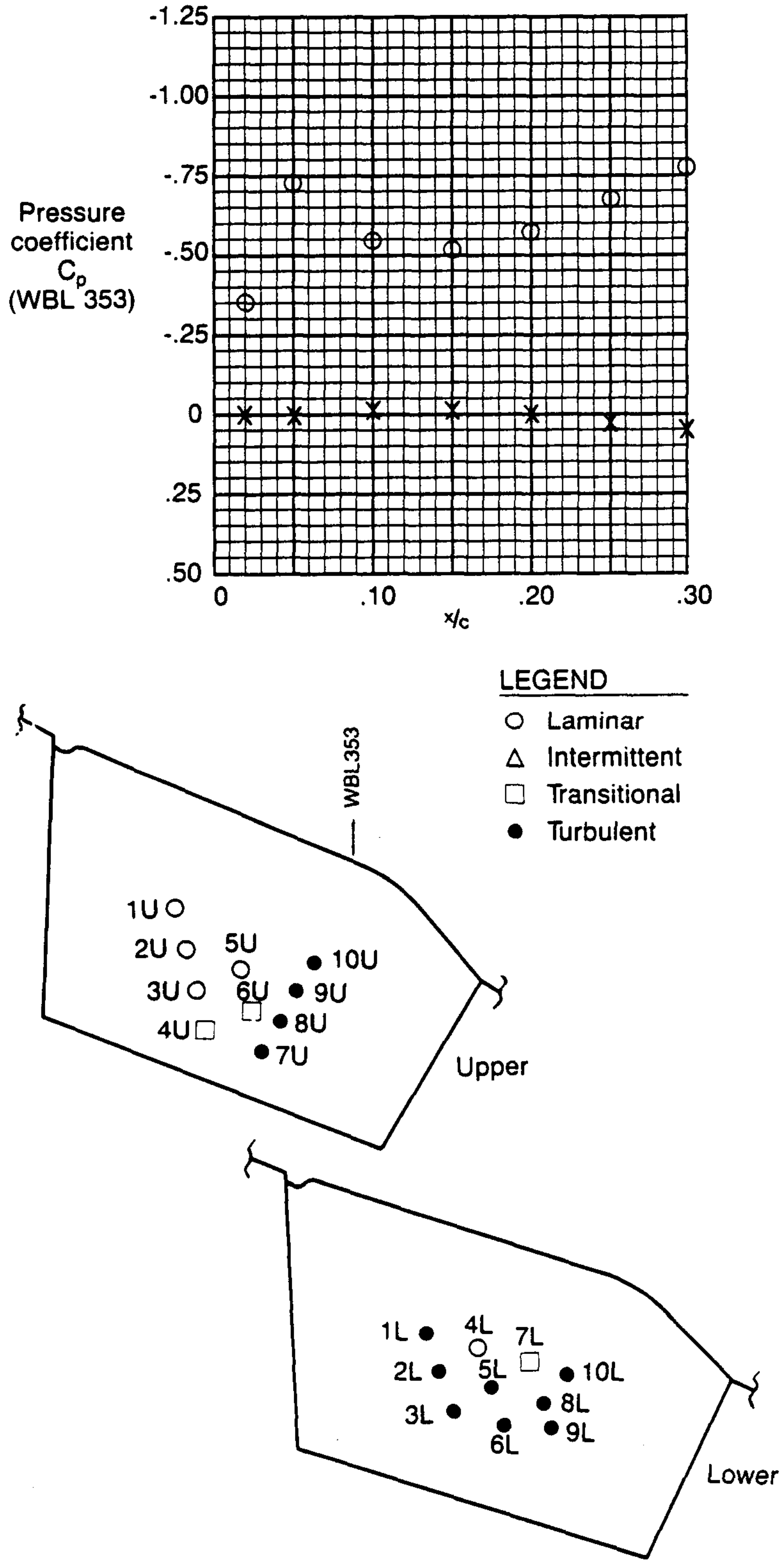
NOTES:

Pressures are from Flight 4



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	10	8	14	1
2U	.20	29	25	35	2
3U	.25	42	34	49	3
4U	.30	52	42	66	4
5U	.20	53	44	65	4
6U	.25	52	43	61	3
7U	.30	48	39	62	4
8U	.25	48	38	60	4
9U	.20	43	35	53	3
10U	.15	40	32	47	3
Lower					
1L	.15	102	35	243	41
2L	.20	40	31	53	4
3L	.25	41	33	53	3
4L	.15	13	11	15	1
5L	.20	35	21	82	11
6L	.25	38	29	52	3
7L	.15	29	14	163	17
8L	.20	38	31	60	4
9L	.235	49	36	67	5
10L	.15	14	12	20	1

Figure 6-100. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.029



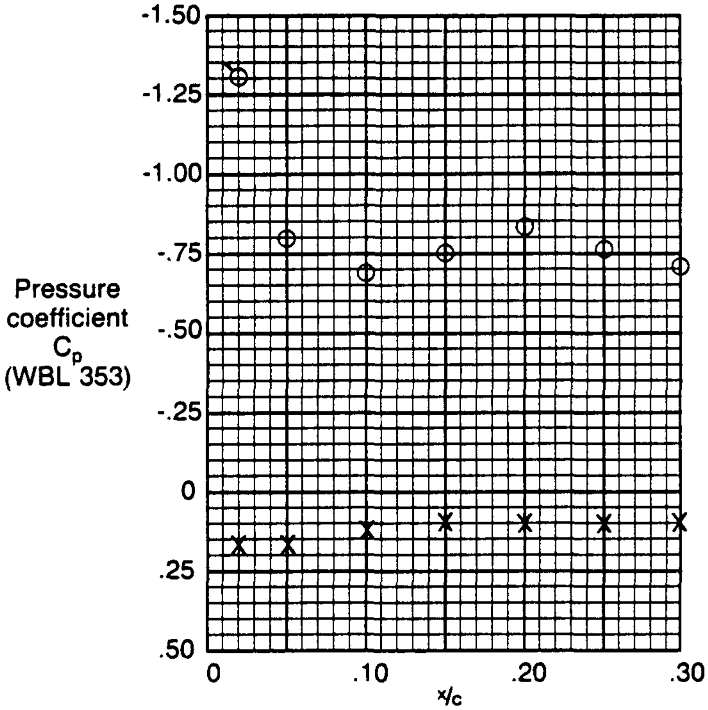
Mach No. = .825
Altitude = 40 761 ft
C_L = .495
β = 0.0 deg
α_B = 2.45 deg
$N_{1_{E2}}$ = 3953 r/min

NOTES:

Pressure coefficients from Flight 4

Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	6	0
2U	.20	5	5	6	1
3U	.25	8	7	11	0
4U	.30	61	41	163	13
5U	.20	9	9	9	0
6U	.25	88	47	192	22
7U	.30	34	27	42	3
8U	.25	34	27	41	3
9U	.20	32	26	44	3
10U	.15	35	28	46	3
Lower					
1L	.15	34	24	114	6
2L	.20	42	33	53	3
3L	.25	39	33	48	3
4L	.15	17	14	21	1
5L	.20	22	18	34	2
6L	.25	35	28	41	2
7L	.15	375	177	515	59
8L	.20	36	30	47	3
9L	.235	46	38	63	4
10L	.15	36	30	49	3

Figure 6-101. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.030

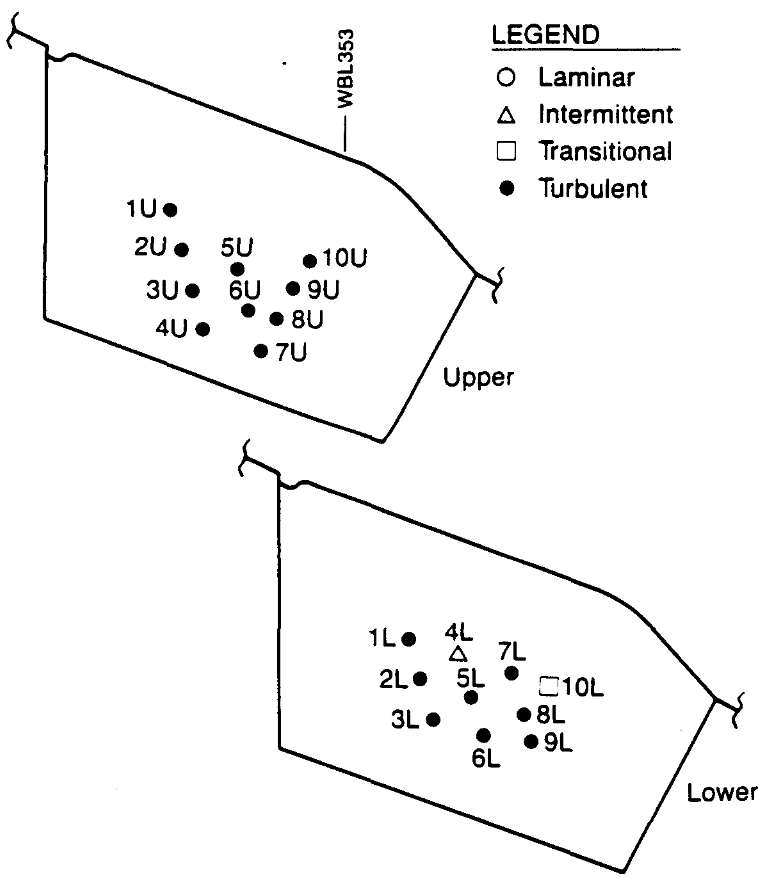


Mach No. = .706
Altitude = 35 180 ft
C_L = .513
β = +1.2 deg
α_B = 3.55 deg
$N_{1_{E2}}$ = 4084 r/min

NOTES:

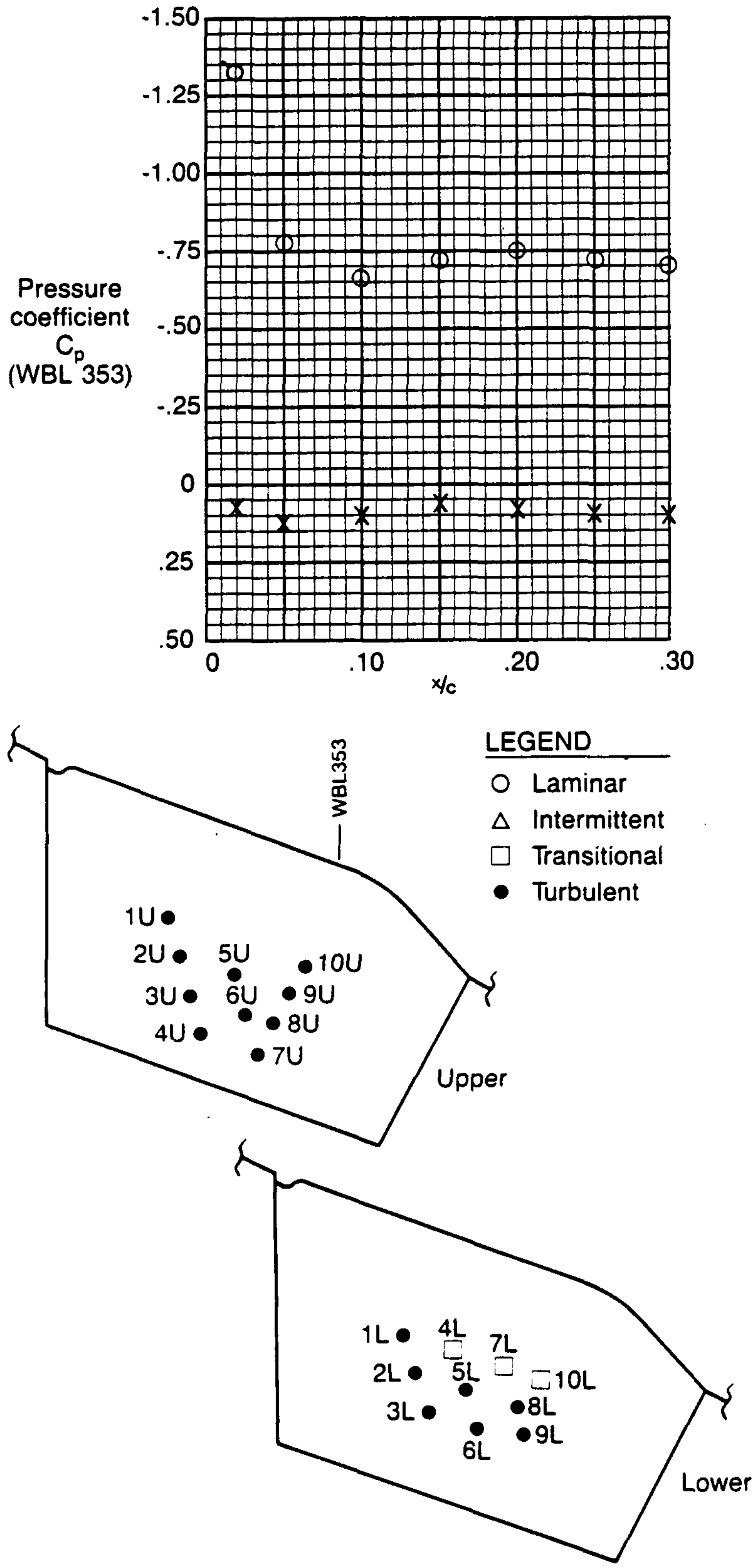
Pressure coefficients corrected using ΔP_{Port5}

Pressure limited by transducer limit



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	43	35	52	3
2U	.20	45	37	56	3
3U	.25	59	47	71	4
4U	.30	67	54	82	5
5U	.20	61	52	74	4
6U	.25	64	54	76	4
7U	.30	65	53	83	5
8U	.25	62	49	84	5
9U	.20	51	42	65	4
10U	.15	47	39	58	3
Lower					
1L	.15	31	25	40	3
2L	.20	47	38	63	4
3L	.25	48	38	57	4
4L	.15	34	12	231	37
5L	.20	24	20	29	2
6L	.25	42	35	49	3
7L	.15	51	39	70	6
8L	.20	39	32	51	3
9L	.235	51	39	70	6
10L	.15	433	221	647	80

Figure 6-102. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.031



Mach No. = .704
Altitude = 35 213 ft
C_L = .515
β = -0.5 deg
α_B = 3.47 deg
$N_{1_{E2}}$ = 2537 r/min

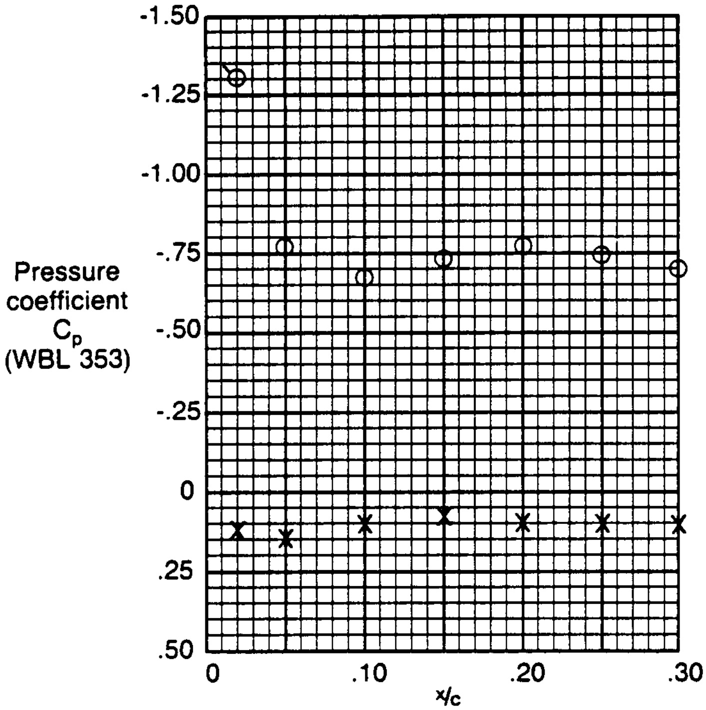
NOTES:

Pressure coefficients corrected using ΔP_{Port5}

ↄ Pressure limited by transducer limit

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	39	32	49	3
2U	.20	42	34	50	3
3U	.25	58	47	71	4
4U	.30	65	52	88	5
5U	.20	60	51	70	4
6U	.25	63	50	77	5
7U	.30	65	49	86	5
8U	.25	59	46	72	5
9U	.20	50	41	61	4
10U	.15	45	37	53	3
Lower					
1L	.15	37	29	48	3
2L	.20	46	37	61	3
3L	.25	49	39	62	4
4L	.15	125	16	353	70
5L	.20	23	19	31	2
6L	.25	43	36	56	4
7L	.15	493	145	682	87
8L	.20	44	32	58	4
9L	.235	58	44	79	6
10L	.15	113	11	607	115

Figure 6-103. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.032

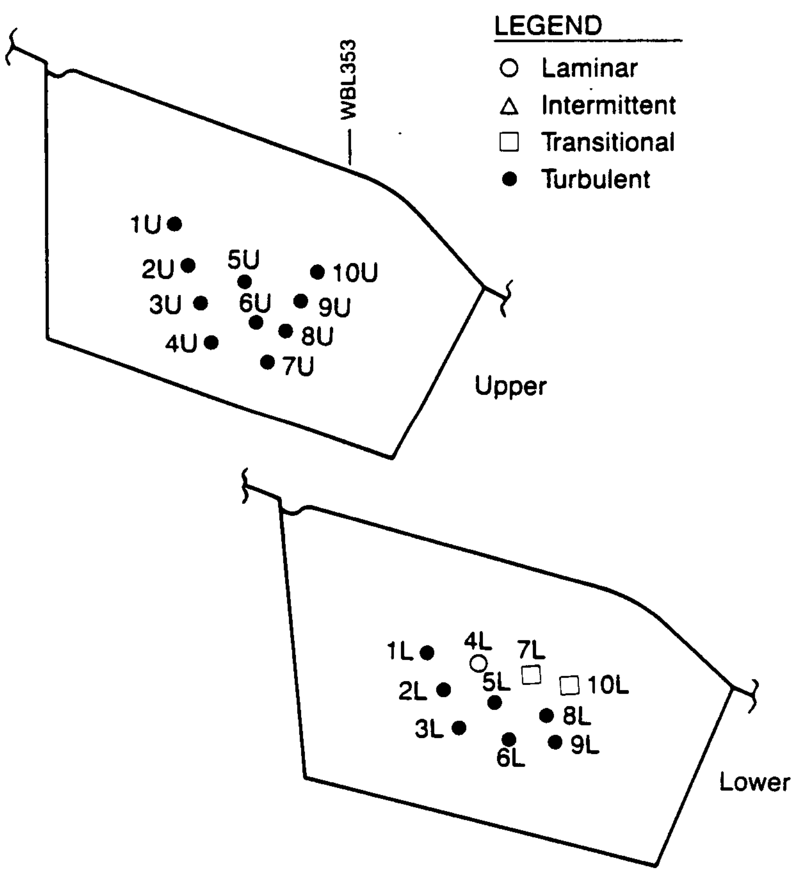


Mach No. = .706
Altitude = 35 154 ft
C_L = .513
β = +0.1 deg
α_B = 3.45 deg
$N_{1_{E2}}$ = 3528 r/min

NOTES:

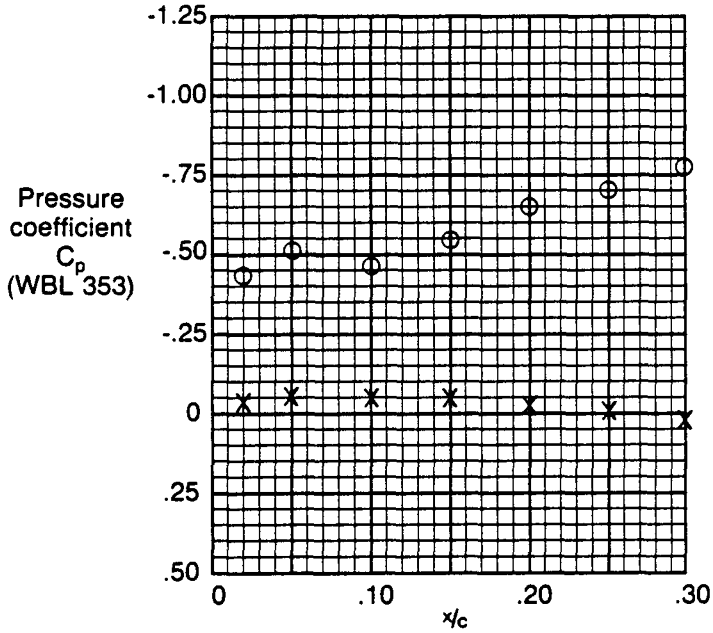
Pressure coefficients corrected using ΔP_{Port5}

Pressure limited by transducer limit



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	40	32	50	3
2U	.20	42	36	57	3
3U	.25	59	47	73	4
4U	.30	66	56	82	5
5U	.20	60	50	71	4
6U	.25	63	51	76	5
7U	.30	65	54	86	6
8U	.25	60	48	77	5
9U	.20	50	37	62	4
10U	.15	46	38	61	4
Lower					
1L	.15	32	25	40	3
2L	.20	47	37	58	4
3L	.25	49	39	59	4
4L	.15	15	12	53	3
5L	.20	23	19	29	2
6L	.25	43	35	51	3
7L	.15	366	204	615	67
8L	.20	43	33	54	4
9L	.235	57	43	75	6
10L	.15	324	104	556	93

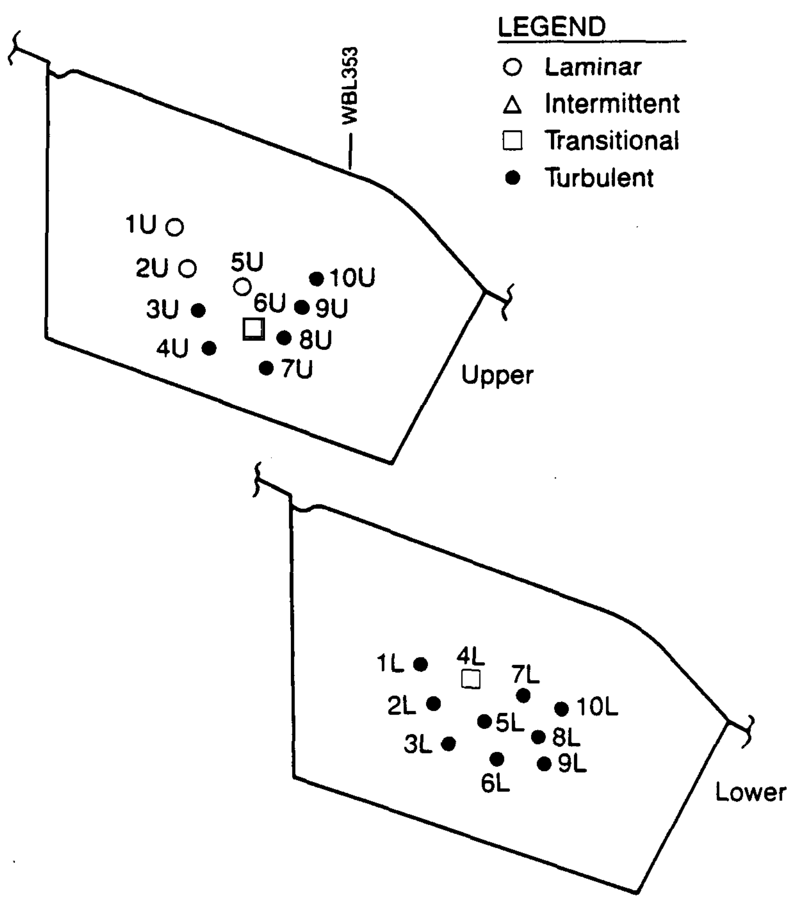
Figure 6-104. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.033



Mach No. = .800
Altitude = 35 325 ft
C_L = .400
β = -0.1 deg
α_B = 2.01 deg
$N_{1_{E2}}$ = 3568 r/min

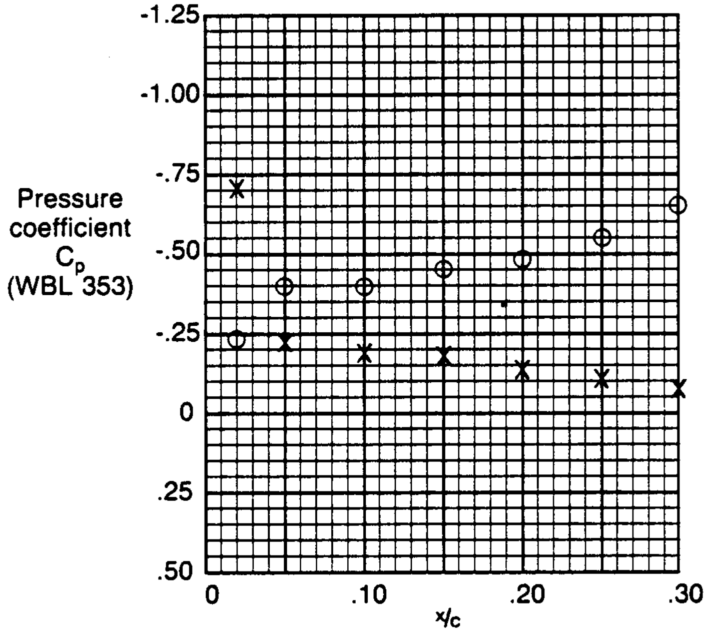
NOTES:

Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	7	5	23	1
2U	.20	9	6	14	1
3U	.25	22	18	33	2
4U	.30	37	32	44	2
5U	.20	9	9	10	0
6U	.25	242	130	381	50
7U	.30	37	31	46	3
8U	.25	46	36	56	3
9U	.20	44	35	55	3
10U	.15	37	30	46	3
Lower					
1L	.15	41	32	53	3
2L	.20	53	44	63	4
3L	.25	46	37	57	4
4L	.15	469	271	608	51
5L	.20	22	18	28	2
6L	.25	41	35	53	3
7L	.15	44	32	186	16
8L	.20	41	33	51	3
9L	.235	53	40	69	5
10L	.15	39	33	50	3

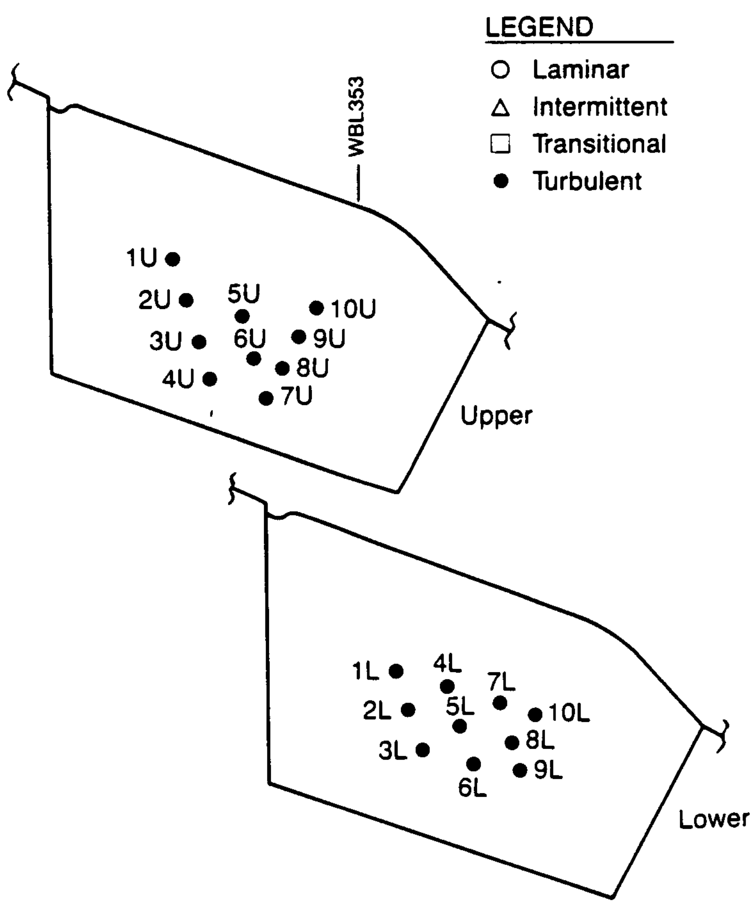
Figure 6-105. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.034



Mach No. = .800
Altitude = 25 005 ft
C_L = .248
β = -0.6 deg
α_B = 8.8 deg
$N_{1_{E2}}$ = 3570 r/min

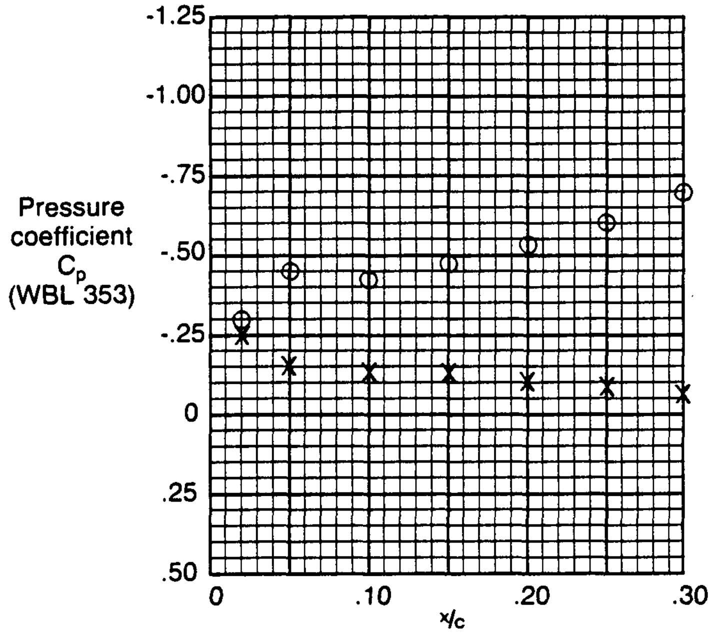
NOTES:

Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	45	37	56	3
2U	.20	41	34	50	3
3U	.25	55	46	65	4
4U	.30	57	49	73	4
5U	.20	53	44	62	4
6U	.25	58	49	68	4
7U	.30	55	45	68	5
8U	.25	54	45	68	5
9U	.20	49	37	65	4
10U	.15	44	37	56	3
Lower					
1L	.15	42	35	51	3
2L	.20	59	48	73	5
3L	.25	59	44	76	5
4L	.15	46	39	55	3
5L	.20	30	26	36	2
6L	.25	53	42	67	5
7L	.15	50	42	64	4
8L	.20	51	40	61	4
9L	.235	66	49	84	6
10L	.15	51	42	62	4

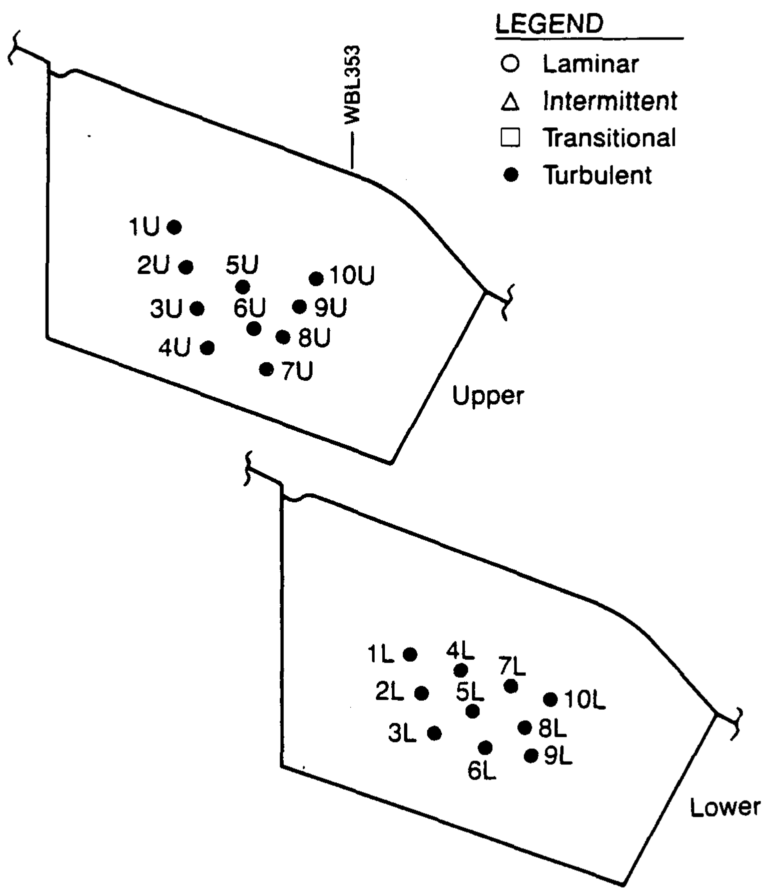
Figure 6-106. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.035



Mach No. = .794
Altitude = 24 979 ft
C_L = .251
β = 2.6 deg
α_B = 1.23 deg
$N_{1_{E2}}$ = 3569 r/min

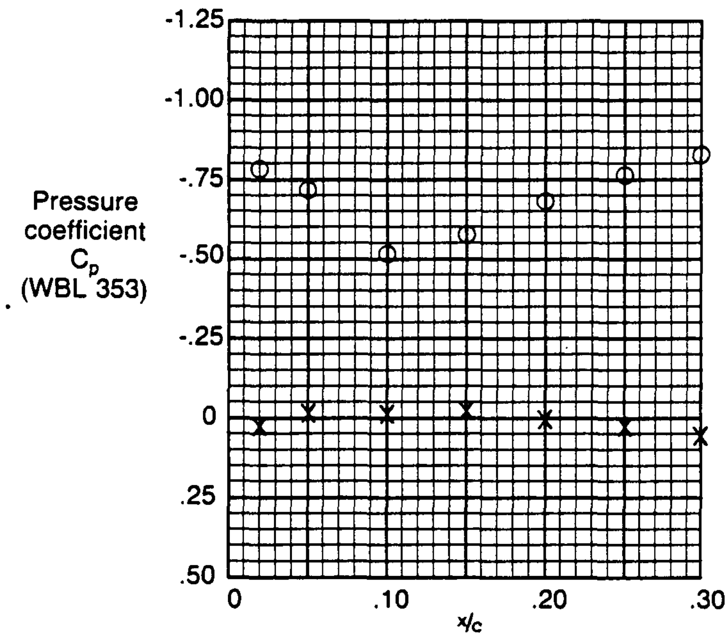
NOTES:

Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U	.15	42	33	53	3
2U	.20	38	31	45	3
3U	.25	51	42	64	4
4U	.30	54	44	66	4
5U	.20	47	39	59	4
6U	.25	57	48	66	4
7U	.30	54	44	69	5
8U	.25	52	43	67	4
9U	.20	49	39	61	4
10U	.15	43	35	54	3
		Lower			
1L	.15	41	32	51	3
2L	.20	58	46	74	5
3L	.25	56	45	70	5
4L	.15	41	34	54	4
5L	.20	27	21	31	2
6L	.25	48	38	59	4
7L	.15	38	31	48	3
8L	.20	44	34	58	4
9L	.235	61	47	78	6
10L	.15	49	40	60	4

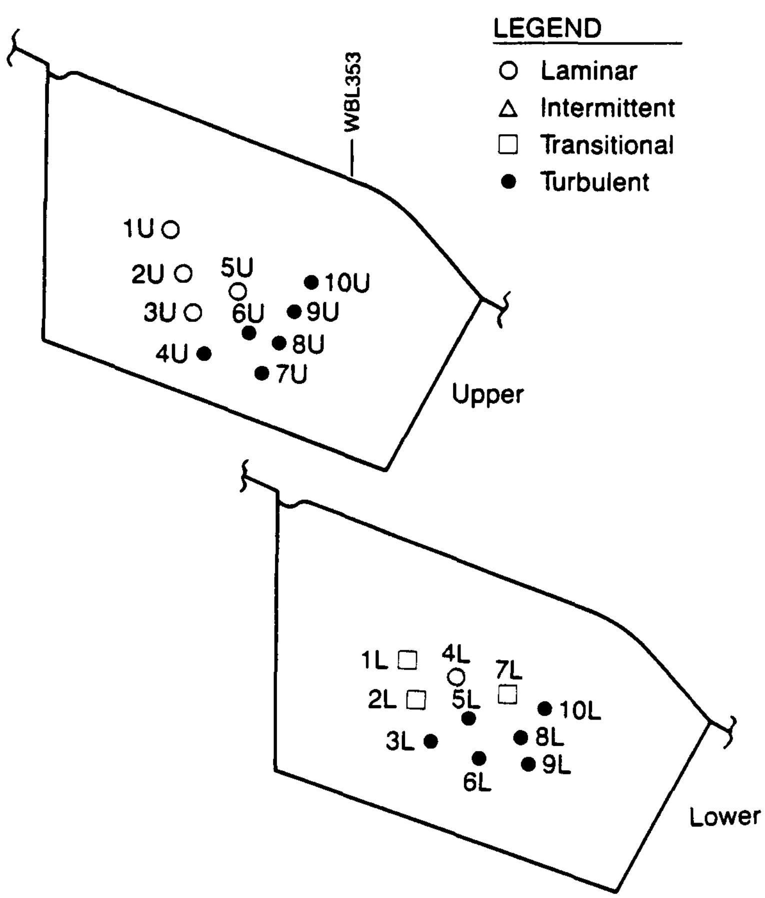
Figure 6-107. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.036



Mach No. = .798
Altitude = 38 015 ft
C_L = .462
β = +0.1 deg
α_B = 2.46 deg
$N_{1_{E2}}$ = 3649 r/min

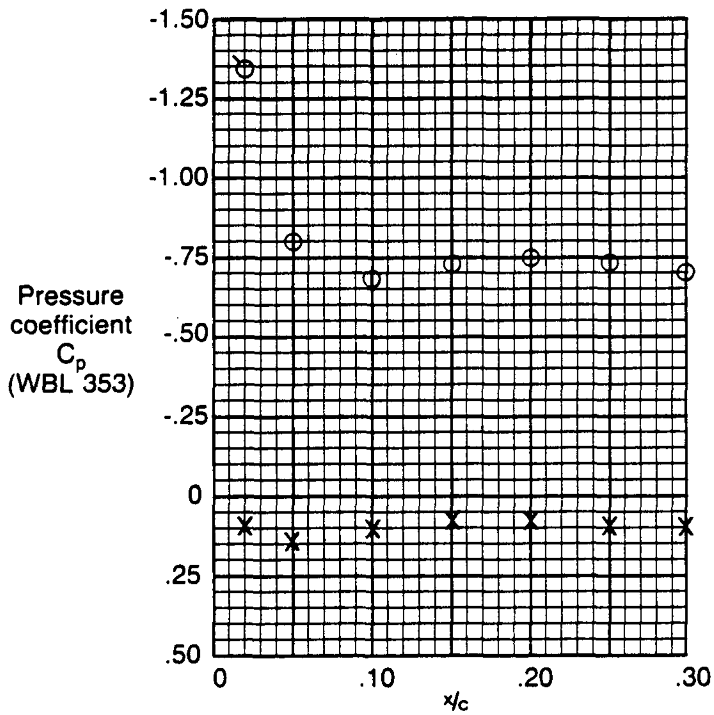
NOTES:

Pressure coefficients corrected using ΔP_{Port5}



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	5	5	6	0
2U	.20	5	5	6	0
3U	.25	13	11	20	1
4U	.30	37	31	44	2
5U	.20	9	9	9	0
6U	.25	37	30	46	2
7U	.30	41	33	53	3
8U	.25	40	31	49	3
9U	.20	38	30	47	3
10U	.15	38	31	46	3
Lower					
1L	.15	52	31	156	19
2L	.20	58	38	219	17
3L	.25	42	33	50	3
4L	.15	16	13	30	2
5L	.20	24	19	29	2
6L	.25	38	31	46	3
7L	.15	488	313	651	54
8L	.20	38	31	50	3
9L	.235	50	37	65	5
10L	.15	38	30	52	3

Figure 6-108. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.037

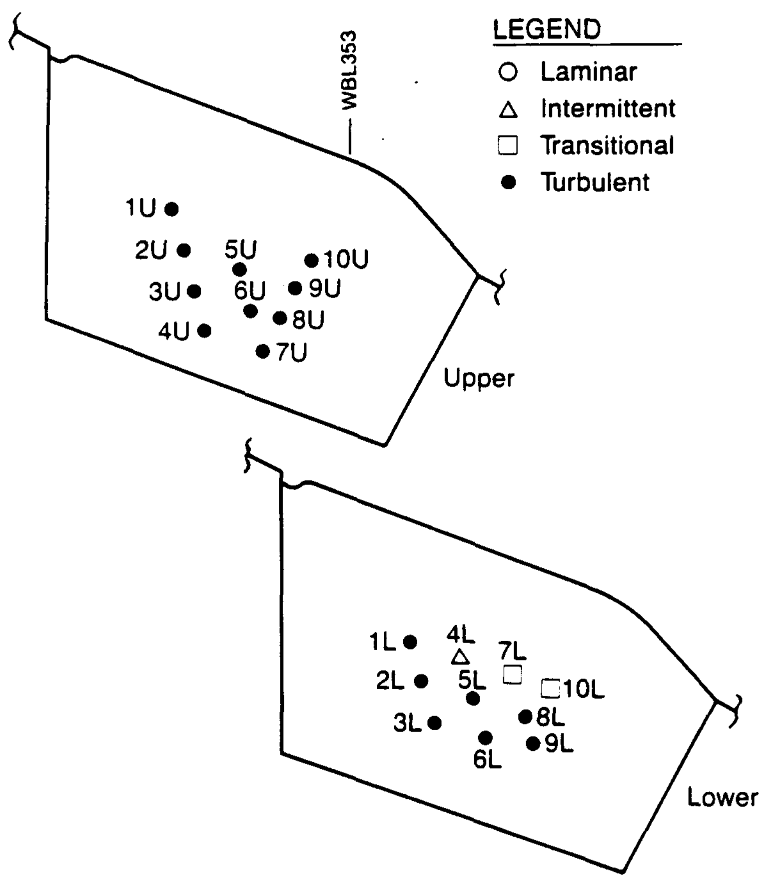


Mach No. = .698
Altitude = 35 215 ft
C_L = .525
β = -0.7 deg
α_B = 3.63 deg
$N_{1_{E2}}$ = 2099 r/min

NOTES:

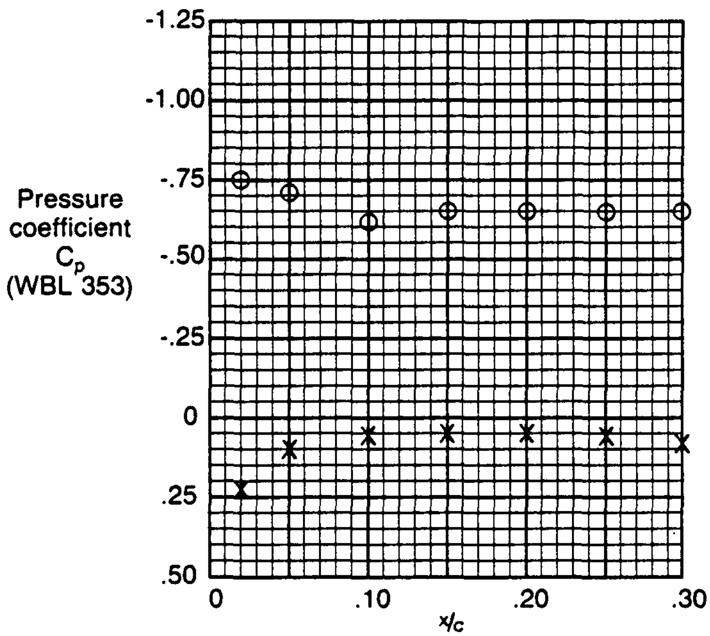
Pressure coefficients corrected using ΔP_{Port5}

ꝺ Pressure limited by transducer limit

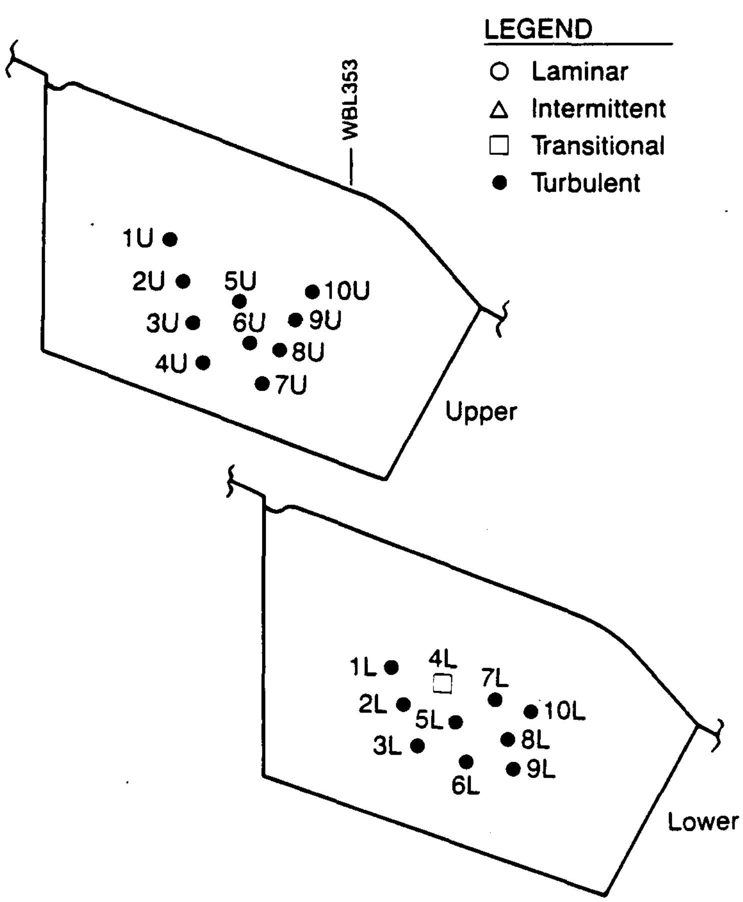


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	41	33	51	3
2U	.20	43	36	51	3
3U	.25	59	48	72	4
4U	.30	67	54	85	5
5U	.20	61	50	76	4
6U	.25	65	53	76	4
7U	.30	66	49	81	6
8U	.25	62	50	85	5
9U	.20	51	42	64	4
10U	.15	46	36	59	4
Lower					
1L	.15	35	26	46	3
2L	.20	48	40	63	4
3L	.25	50	40	64	4
4L	.15	77	9	442	86
5L	.20	24	19	29	2
6L	.25	43	33	52	3
7L	.15	193	31	609	174
8L	.20	42	33	57	4
9L	.235	56	43	72	6
10L	.15	478	34	747	133

Figure 6-109. Pressure and Hot-Film Data—Flight 3, Condition No. B1.00.0053.038

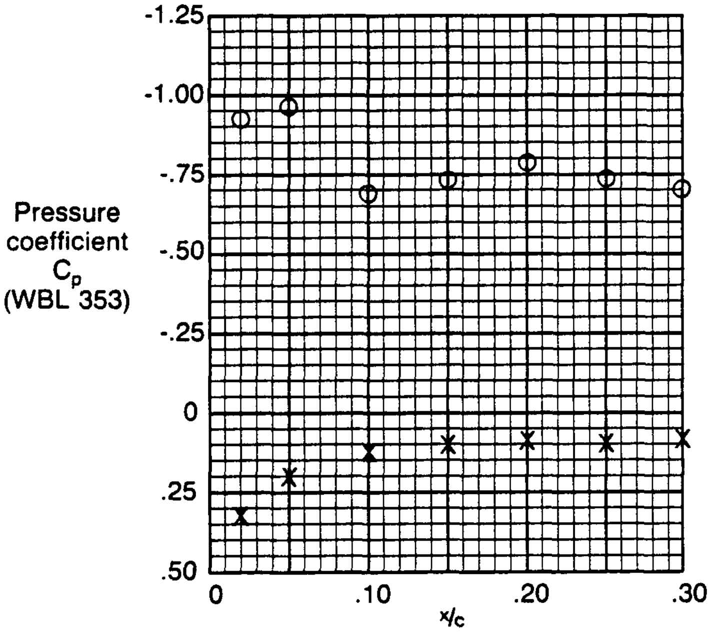


Mach No. = .700
Altitude = 30 001 ft
C_L = .448
β = 0.0 deg
α_B = 2.92 deg
$N_{1_{E2}}$ = 3412 r/min

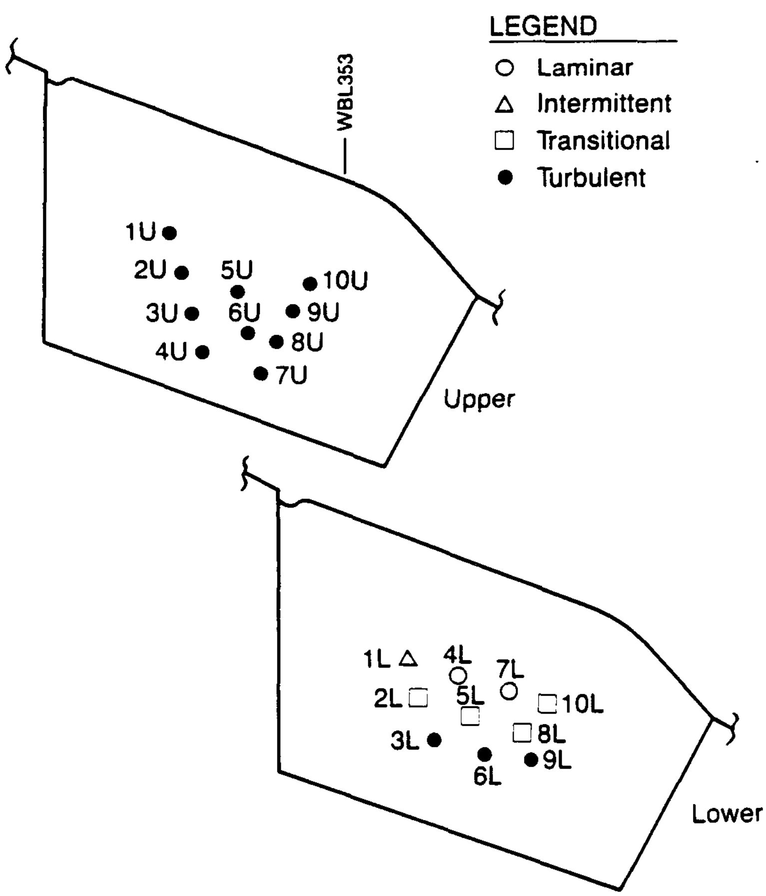


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	39	33	49	3
2U	.20	56	46	68	4
3U	.25	63	54	82	5
4U	.30	72	58	91	6
5U	.20	64	49	79	5
6U	.25	74	63	87	6
7U	.30	71	58	98	7
8U	.25	66	56	78	6
9U	.20	55	46	68	5
10U	.15	48	36	59	4
Lower					
1L	.15	39	31	51	4
2L	.20	56	44	79	6
3L	.25	59	47	72	5
4L	.15	224	113	451	66
5L	.20	30	26	36	2
6L	.25	54	42	71	5
7L	.15	50	41	101	9
8L	.20	50	39	64	5
9L	.235	63	49	86	7
10L	.15	43	34	54	4

Figure 6-110. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.001

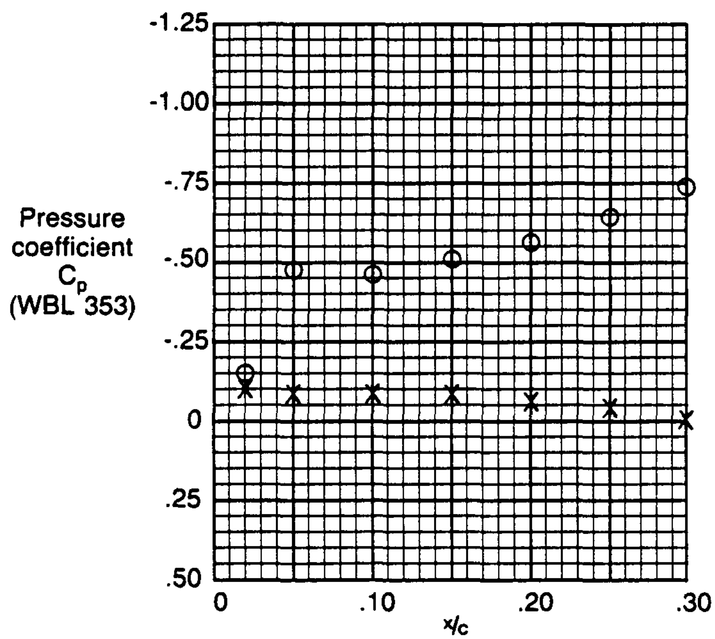


Mach No. = .708
Altitude = 29 897 ft
C_L = .436
β = +5.2 deg
α_B = 3.66 deg
$N_{1_{E2}}$ = 3539 r/min

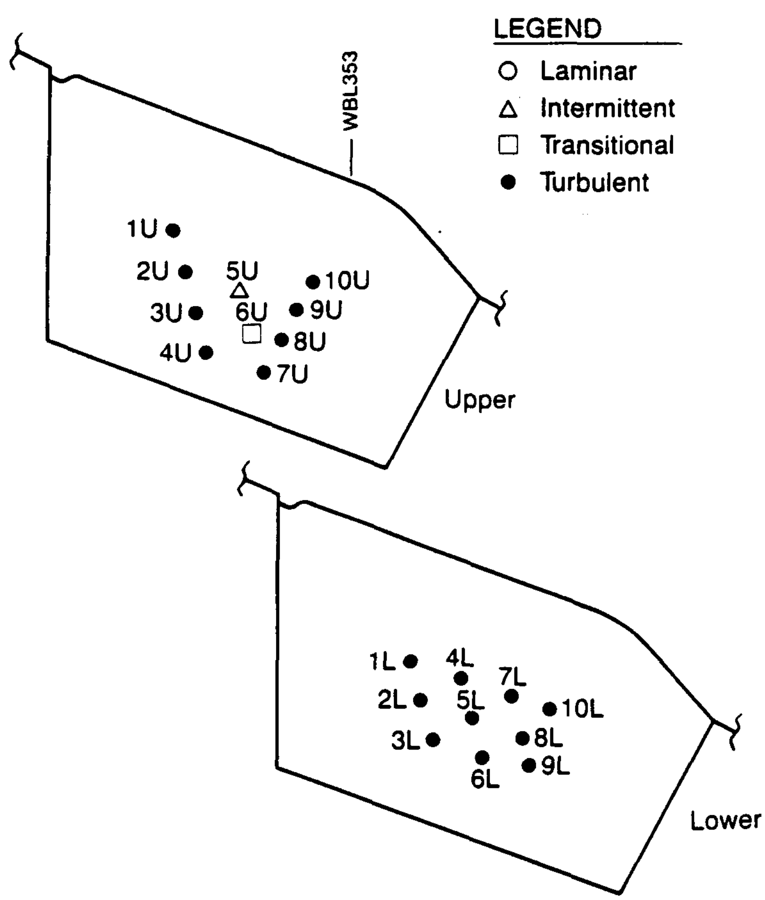


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	49	40	65	5
2U	.20	55	44	67	5
3U	.25	64	52	79	5
4U	.30	75	63	93	6
5U	.20	70	57	87	6
6U	.25	78	65	96	7
7U	.30	75	62	96	7
8U	.25	68	52	80	6
9U	.20	57	44	71	5
10U	.15	52	40	66	5
Lower					
1L	.15	192	9	683	250
2L	.20	232	34	769	232
3L	.25	48	38	59	4
4L	.15	9	8	15	1
5L	.20	335	238	436	35
6L	.25	41	36	51	3
7L	.15	9	7	11	1
8L	.20	102	40	264	57
9L	.235	56	45	72	7
10L	.15	180	15	534	148

Figure 6-111. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.002

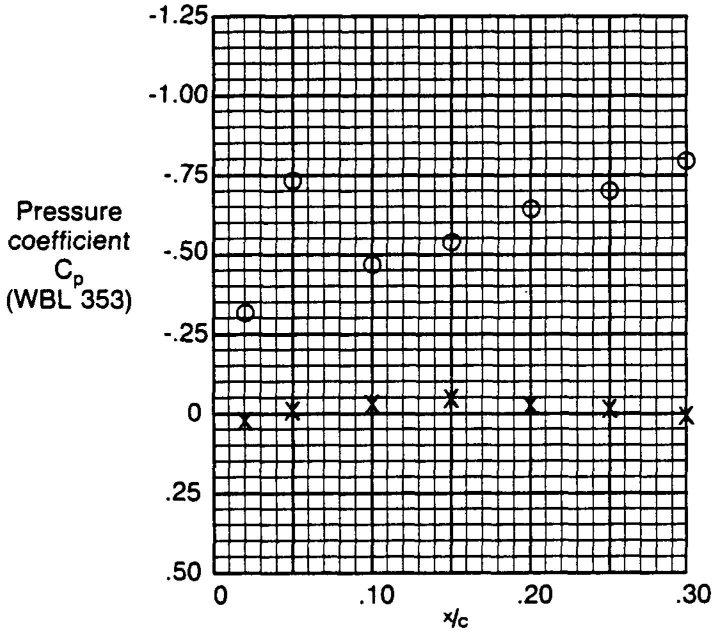


Mach No.	=	.800
Altitude	=	30 517 ft
C_L	=	.350
β	=	-0.3 deg
α_B	=	1.71 deg
$N_{1_{E2}}$	=	3586 r/min

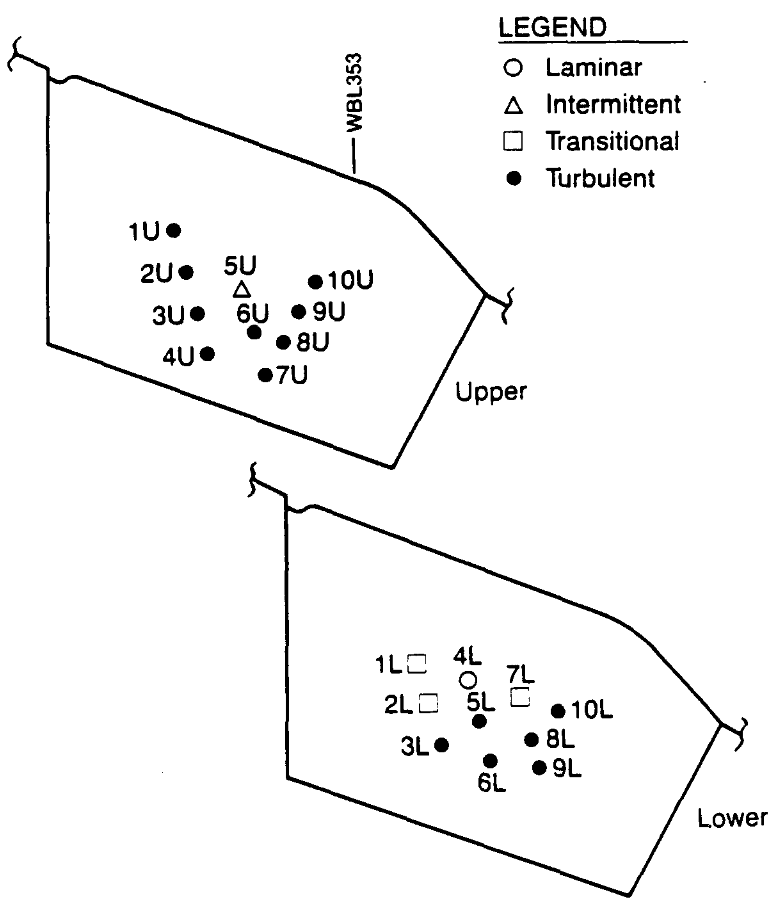


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	39	32	51	3
2U	.20	46	38	55	3
3U	.25	53	44	66	4
4U	.30	52	43	62	4
5U	.20	41	10	524	90
6U	.25	64	35	454	80
7U	.30	43	37	52	3
8U	.25	53	43	67	4
9U	.20	50	39	62	5
10U	.15	42	35	51	4
Lower					
1L	.15	48	39	63	4
2L	.20	65	54	88	7
3L	.25	62	53	78	6
4L	.15	40	33	52	4
5L	.20	28	24	32	2
6L	.25	51	41	61	4
7L	.15	40	33	54	4
8L	.20	49	41	61	4
9L	.235	64	48	89	7
10L	.15	47	39	56	4

Figure 6-112. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.003

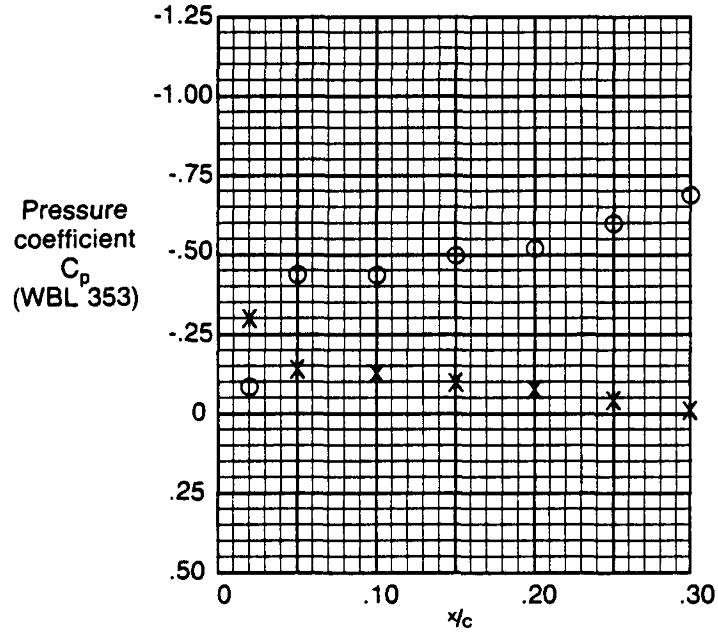


Mach No. = .797
Altitude = 30 585 ft
C_L = .354
β = +3.6 deg
α_B = 2.15 deg
$N_{1_{E2}}$ = 3736 r/min

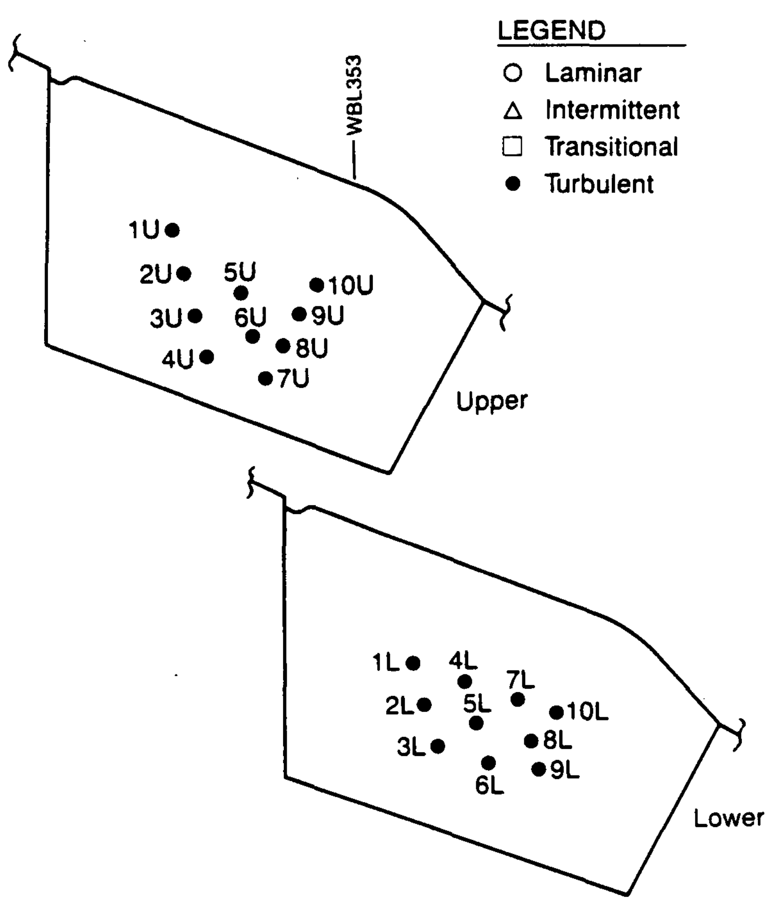


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	32	26	36	2
2U	.20	45	36	56	4
3U	.25	45	36	56	3
4U	.30	38	32	47	3
5U	.20	22	9	179	28
6U	.25	48	38	56	4
7U	.30	45	36	56	4
8U	.25	47	39	58	4
9U	.20	44	35	56	4
10U	.15	44	35	53	4
Lower					
1L	.15	509	120	827	148
2L	.20	83	41	273	45
3L	.25	46	36	60	4
4L	.15	18	14	24	2
5L	.20	25	21	30	2
6L	.25	44	36	55	4
7L	.15	421	146	764	157
8L	.20	43	32	53	4
9L	.235	59	46	88	7
10L	.15	41	33	50	4

Figure 6-113. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.004

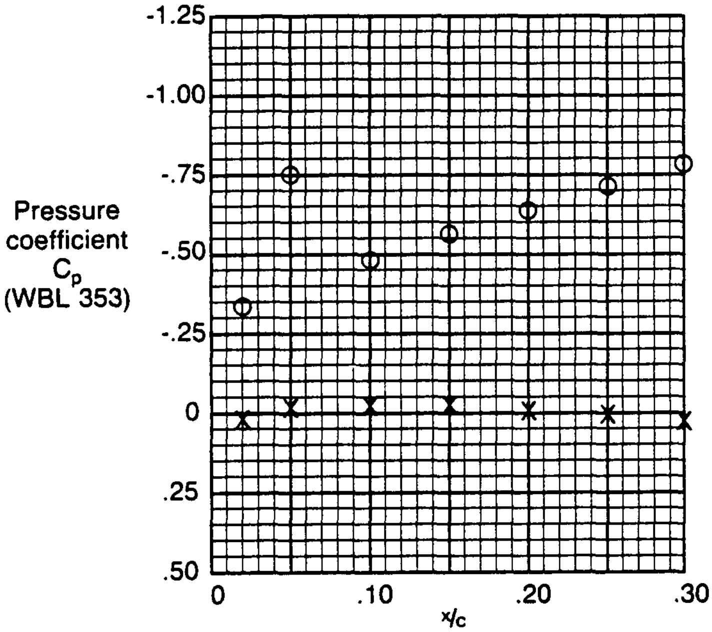


Mach No. = .805
Altitude = 30 590 ft
C_L = .346
β = -3.5 deg
α_B = 1.70 deg
$N_{1_{E2}}$ = 3688 r/min

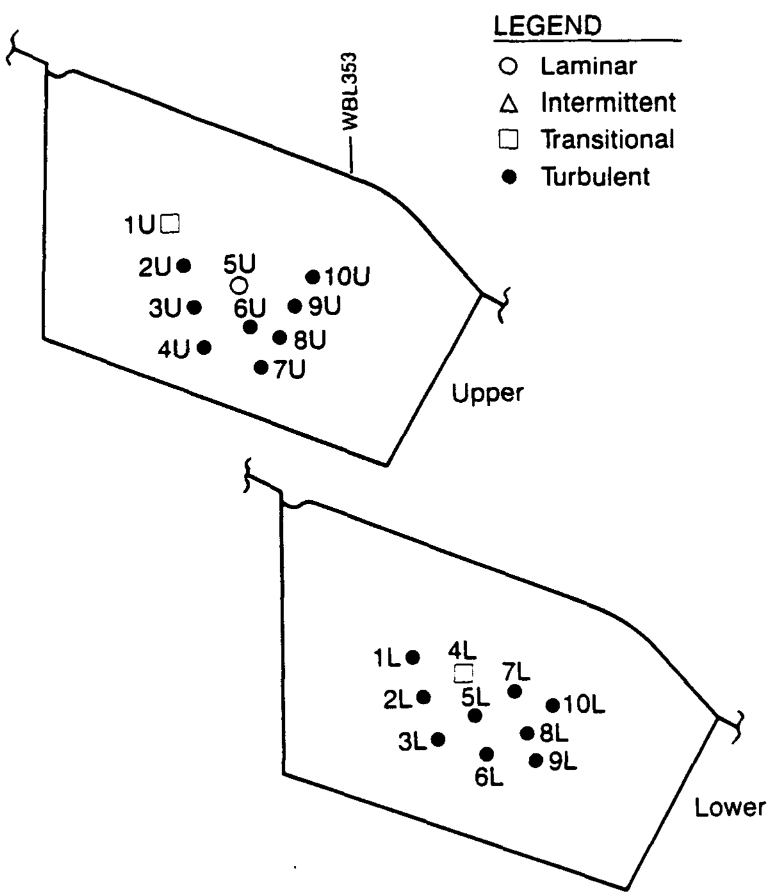


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U	.15	45	37	61	4
2U	.20	45	38	56	3
3U	.25	55	46	67	4
4U	.30	58	49	73	4
5U	.20	57	47	68	4
6U	.25	62	49	75	5
7U	.30	58	45	74	6
8U	.25	57	46	70	5
9U	.20	51	40	63	4
10U	.15	45	38	58	4
		Lower			
1L	.15	48	40	61	5
2L	.20	66	49	85	7
3L	.25	69	55	87	6
4L	.15	53	42	70	5
5L	.20	33	29	42	3
6L	.25	59	43	76	6
7L	.15	49	39	83	7
8L	.20	55	44	68	5
9L	.235	73	56	92	7
10L	.15	54	42	70	5

Figure 6-114. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.005

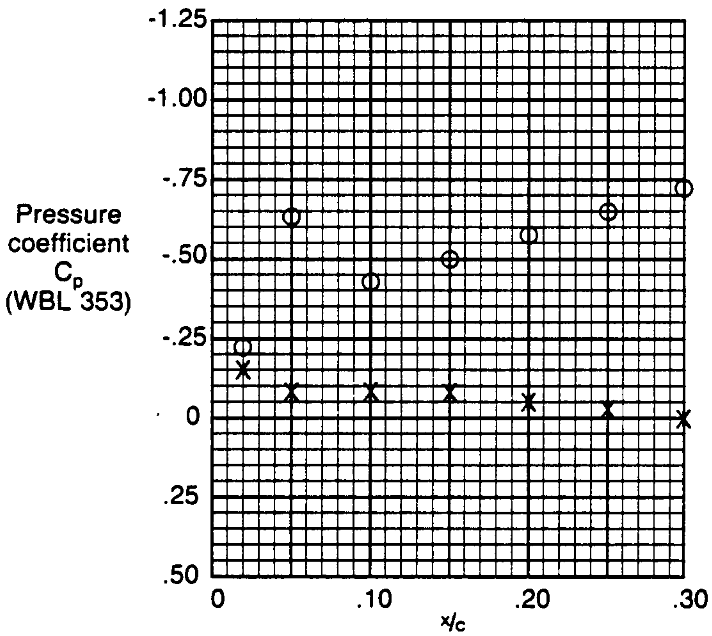


Mach No. = .799
Altitude = 34 447 ft
C_L = .419
β = -0.2 deg
α_B = 2.22 deg
$N_{1_{E2}}$ = 3640 r/min

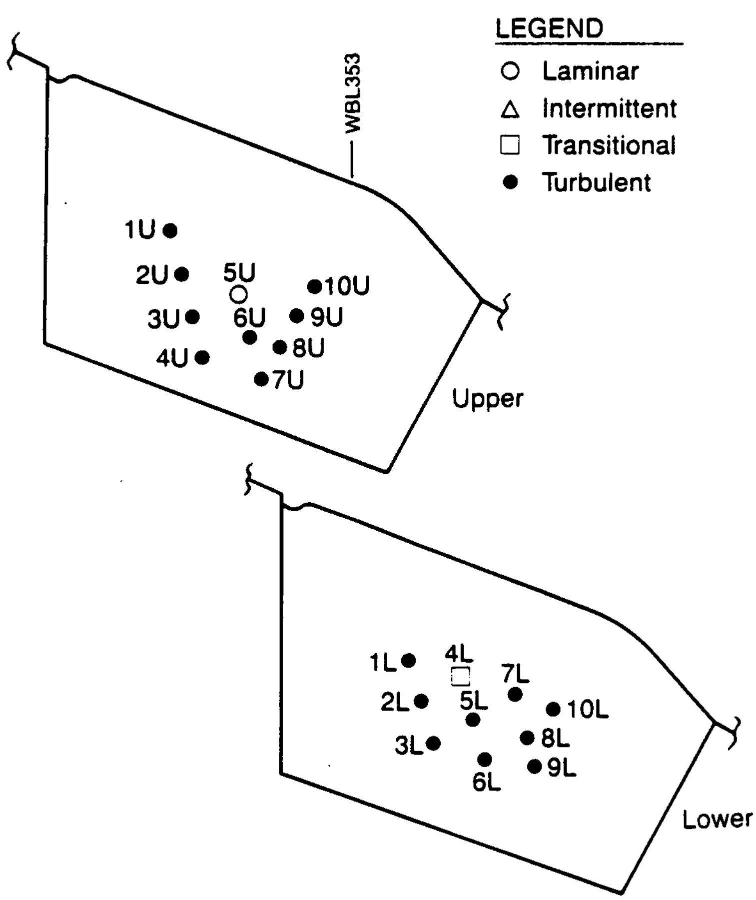


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	348	282	461	34
2U	.20	41	35	49	3
3U	.25	47	40	55	3
4U	.30	38	30	44	3
5U	.20	8	8	9	1
6U	.25	41	35	50	3
7U	.30	44	36	55	4
8U	.25	44	37	55	4
9U	.20	40	32	47	3
10U	.15	40	33	51	3
Lower					
1L	.15	45	36	55	4
2L	.20	54	44	65	5
3L	.25	51	43	67	4
4L	.15	555	430	692	46
5L	.20	25	21	29	2
6L	.25	44	36	58	4
7L	.15	46	34	114	11
8L	.20	44	37	59	4
9L	.235	58	44	82	6
10L	.15	42	35	55	4

Figure 6-115. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.006

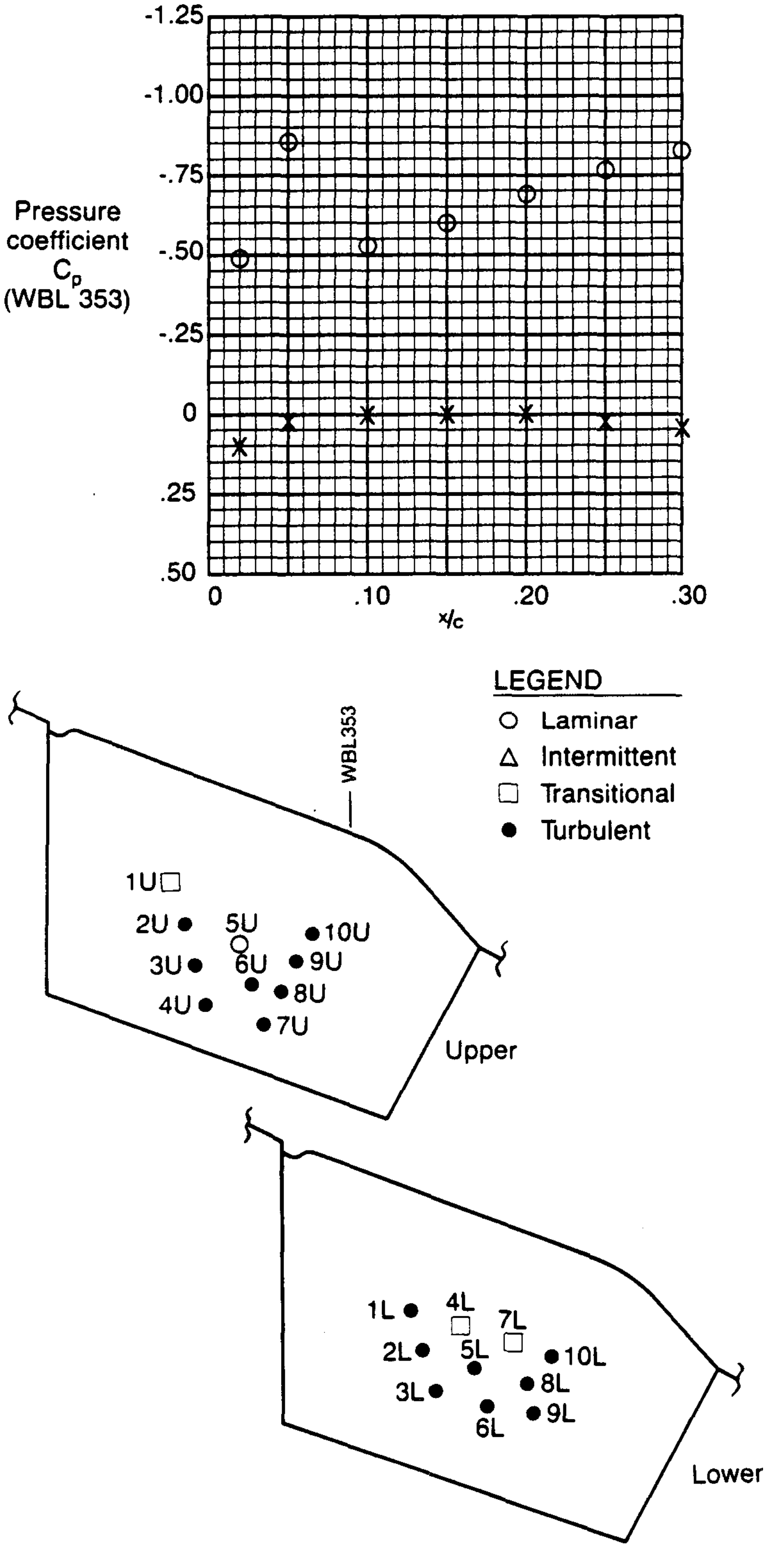


Mach No. = .820
Altitude = 34 448 ft
C_L = .398
β = -0.2 deg
α_B = 1.89 deg
$N_{1_{E2}}$ = 3680 r/min



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	34	27	43	3
2U	.20	39	33	47	3
3U	.25	50	43	59	3
4U	.30	42	36	51	3
5U	.20	8	8	9	0
6U	.25	38	33	45	2
7U	.30	38	31	49	3
8U	.25	42	35	53	4
9U	.20	38	31	45	3
10U	.15	38	31	49	3
Lower					
1L	.15	45	38	56	4
2L	.20	61	51	74	5
3L	.25	58	47	75	5
4L	.15	90	37	228	38
5L	.20	25	21	29	2
6L	.25	45	37	60	4
7L	.15	38	32	49	3
8L	.20	47	35	60	4
9L	.235	59	47	80	6
10L	.15	45	34	56	4

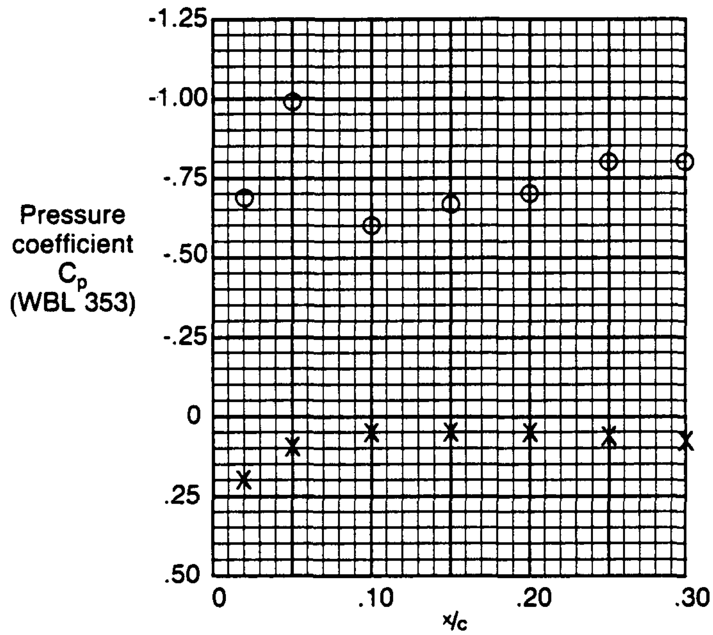
Figure 6-116. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.007



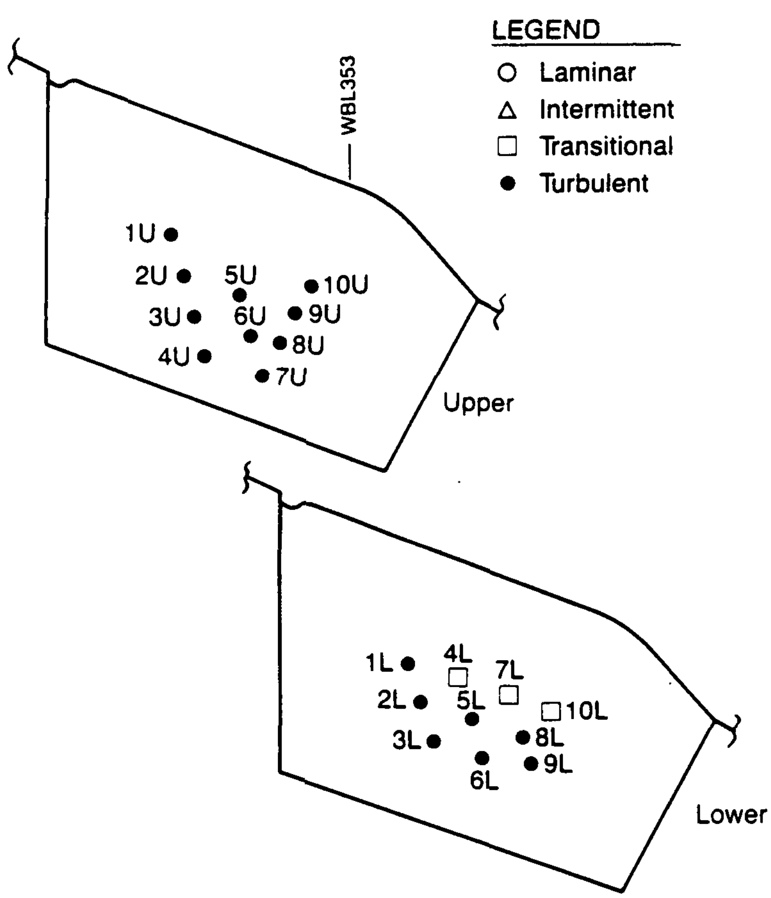
Mach No. = .780
Altitude = 34 449 ft
C_L = .439
β = -0.1 deg
α_B = 2.48 deg
$N_{1_{E2}}$ = 3595 r/min

Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	292	214	457	33
2U	.20	41	35	55	3
3U	.25	49	42	59	4
4U	.30	39	33	44	2
5U	.20	11	10	12	1
6U	.25	45	39	59	3
7U	.30	46	37	65	4
8U	.25	45	39	53	4
9U	.20	42	33	50	3
10U	.15	41	32	51	3
Lower					
1L	.15	36	29	42	3
2L	.20	47	37	62	4
3L	.25	49	39	59	4
4L	.15	196	63	384	73
5L	.20	25	21	31	2
6L	.25	41	33	50	3
7L	.15	348	177	584	74
8L	.20	43	35	52	3
9L	.235	56	41	75	6
10L	.15	41	32	55	4

Figure 6-117. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.008

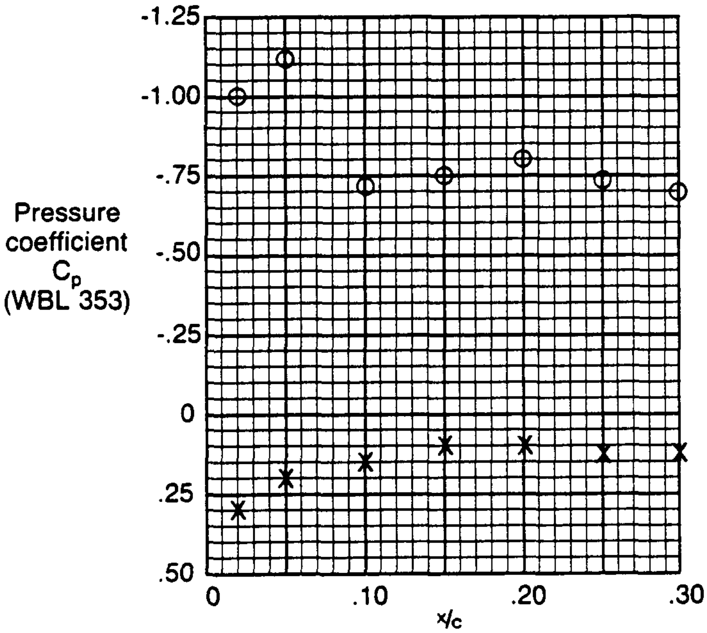


Mach No. = .752
Altitude = 34 453 ft
C_L = .472
β = -0.1 deg
α_B = 2.91 deg
$N_{1_{E2}}$ = 3555 r/min

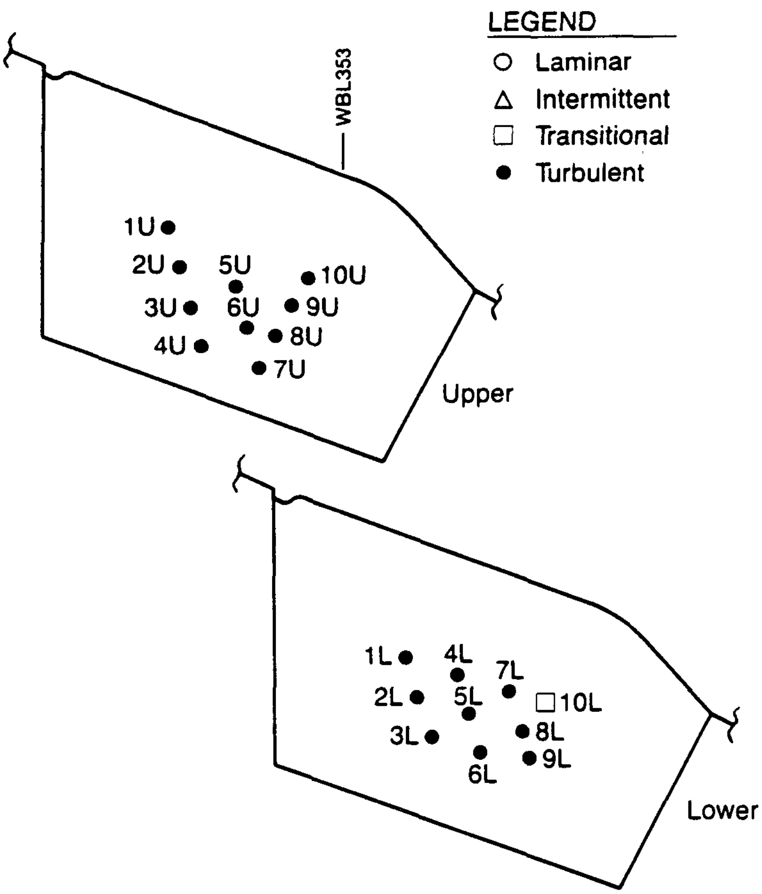


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	35	29	72	4
2U	.20	53	41	66	4
3U	.25	49	42	57	4
4U	.30	54	46	69	5
5U	.20	49	42	60	4
6U	.25	58	45	70	4
7U	.30	54	42	68	5
8U	.25	50	41	61	4
9U	.20	48	42	60	4
10U	.15	44	37	54	4
Lower					
1L	.15	37	30	48	3
2L	.20	48	38	64	4
3L	.25	52	44	64	4
4L	.15	213	75	405	66
5L	.20	25	19	29	2
6L	.25	40	32	50	3
7L	.15	465	262	659	88
8L	.20	42	33	52	4
9L	.235	53	41	75	6
10L	.15	74	39	169	28

Figure 6-118. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.009

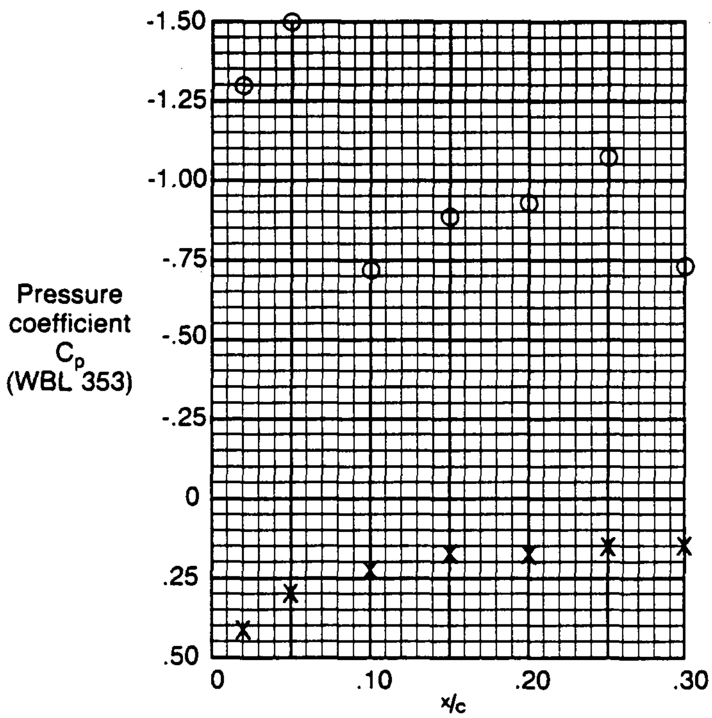


Mach No. = .701
Altitude = 34 471 ft
C_L = .542
β = -0.1 deg
α_B = 3.76 deg
$N_{1_{E2}}$ = 3510 r/min

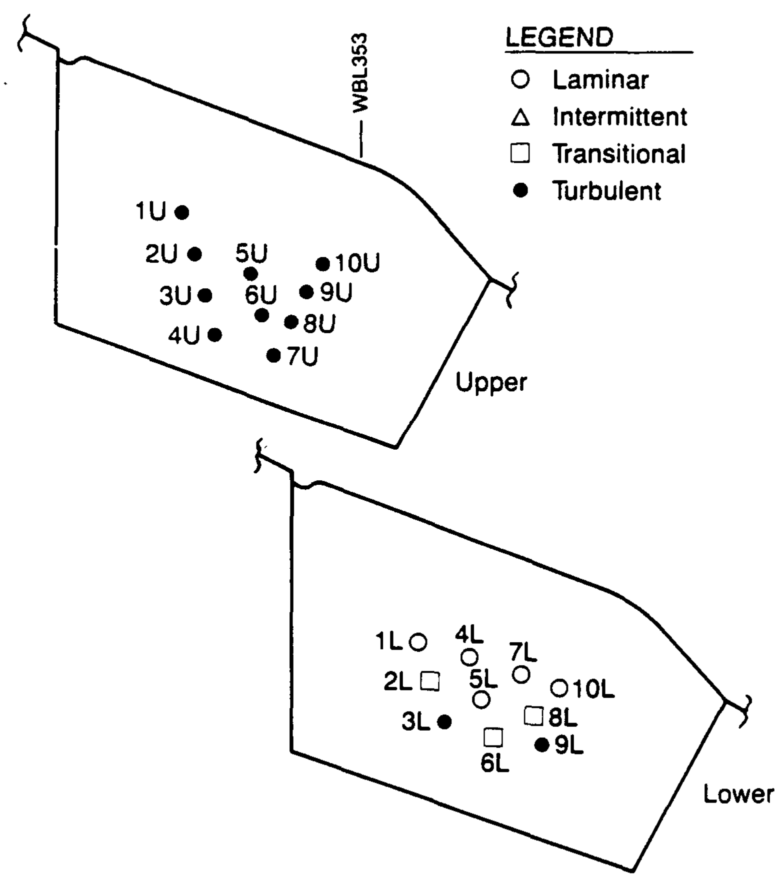


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	43	35	56	3
2U	.20	52	43	74	5
3U	.25	61	47	72	5
4U	.30	70	57	84	5
5U	.20	67	55	83	5
6U	.25	72	60	85	5
7U	.30	69	52	97	7
8U	.25	66	52	81	6
9U	.20	55	43	65	5
10U	.15	47	39	64	4
Lower					
1L	.15	35	28	42	3
2L	.20	52	40	63	5
3L	.25	56	44	67	5
4L	.15	43	33	55	4
5L	.20	27	25	31	2
6L	.25	46	38	53	3
7L	.15	41	33	49	3
8L	.20	46	37	59	4
9L	.235	59	44	78	6
10L	.15	287	108	481	75

Figure 6-119. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.010

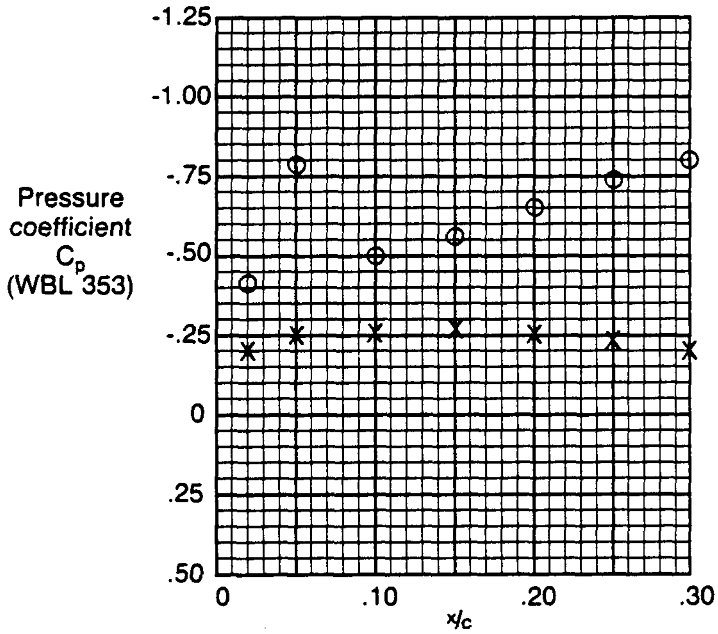


Mach No. = .701
Altitude = 34 451 ft
C_L = .541
β = +6.4 deg
α_B = 4.68 deg
$N_{1_{E2}}$ = 3699 r/min

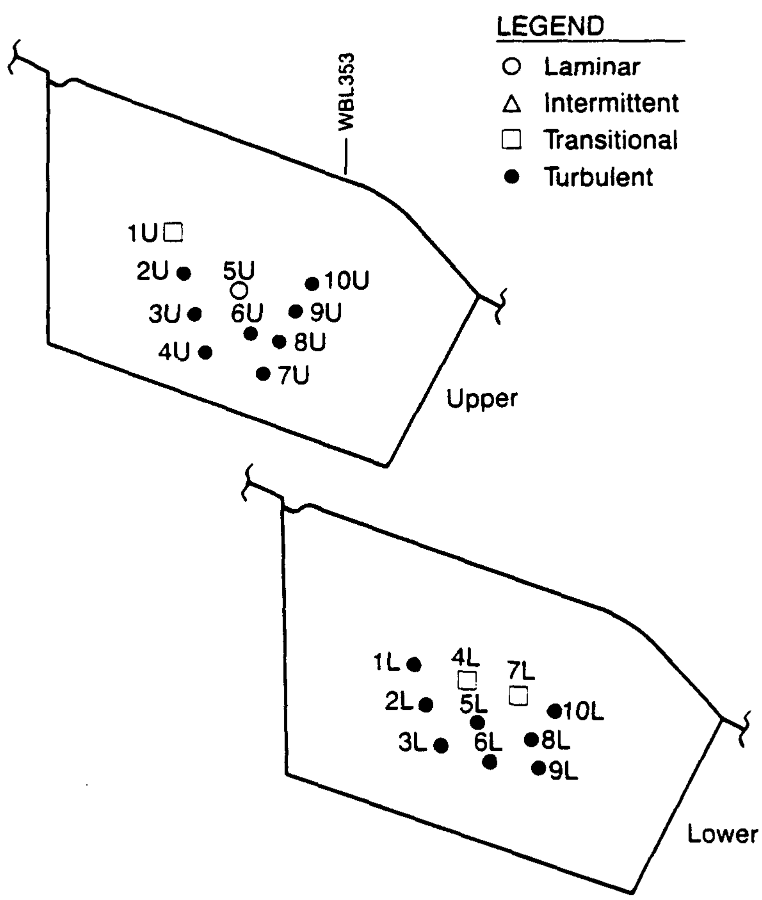


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
		Upper			
1U	.15	53	42	65	5
2U	.20	50	40	58	3
3U	.25	59	49	71	4
4U	.30	74	57	91	7
5U	.20	66	55	84	5
6U	.25	66	56	79	5
7U	.30	75	56	95	9
8U	.25	56	42	69	5
9U	.20	54	44	68	5
10U	.15	49	40	64	4
		Lower			
1L	.15	9	6	10	1
2L	.20	230	83	455	71
3L	.25	40	34	65	4
4L	.15	9	8	11	1
5L	.20	9	8	10	1
6L	.25	191	39	402	86
7L	.15	9	8	11	1
8L	.20	488	369	606	48
9L	.235	52	38	84	8
10L	.15	8	7	10	0

Figure 6-120. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.011

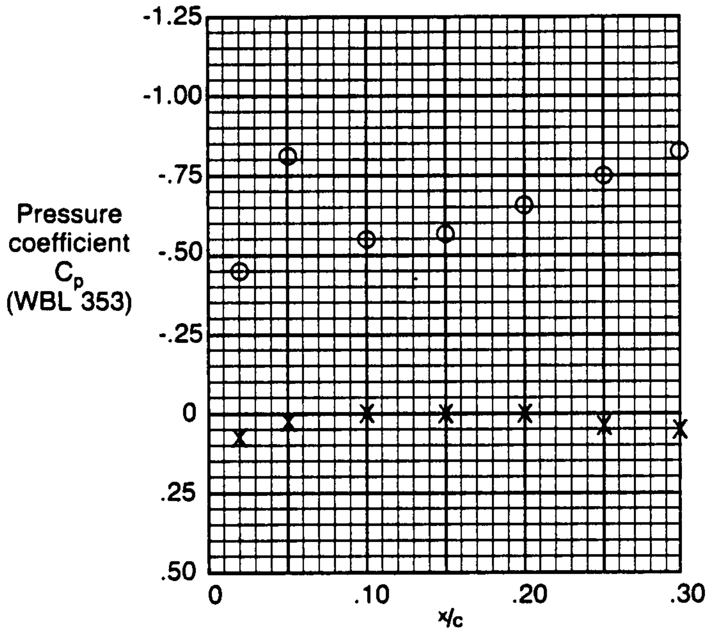


Mach No.	=	.800
Altitude	=	36 176 ft
C_L	=	.450
β	=	-0.1 deg
α_B	=	2.40 deg
$N_{1_{E2}}$	=	3654 r/min

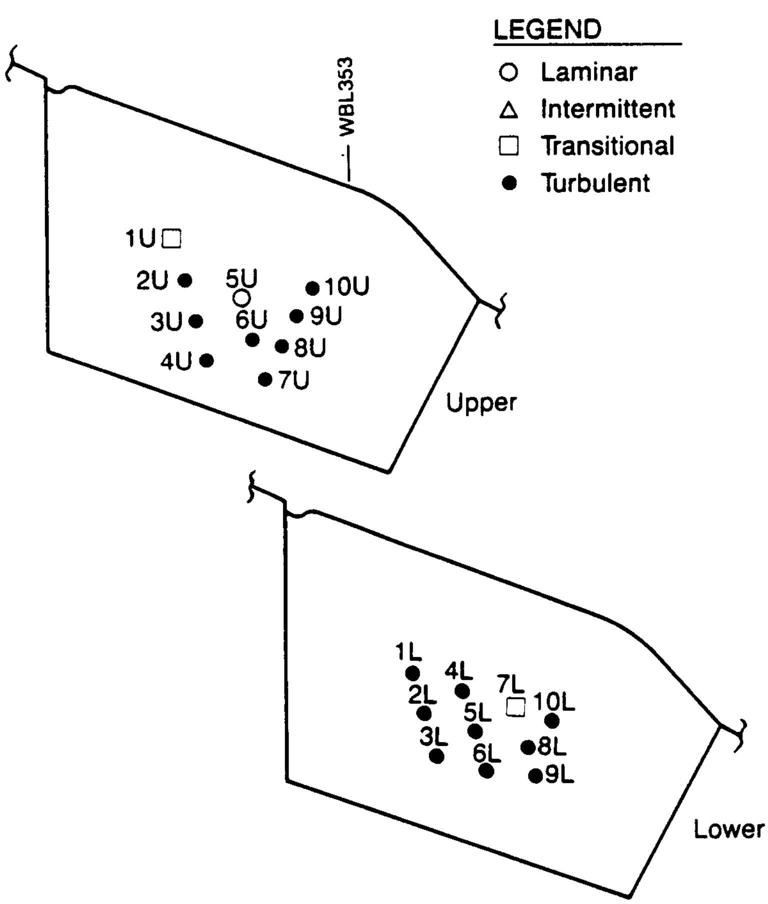


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	352	299	417	26
2U	.20	39	34	50	3
3U	.25	47	40	55	3
4U	.30	37	32	44	3
5U	.20	8	8	9	0
6U	.25	39	34	45	3
7U	.30	42	33	54	4
8U	.25	42	36	56	3
9U	.20	37	32	44	3
10U	.15	39	31	48	4
Lower					
1L	.15	33	26	39	3
2L	.20	46	38	57	4
3L	.25	47	39	56	4
4L	.15	123	33	315	55
5L	.20	25	20	28	2
6L	.25	39	30	46	3
7L	.15	369	229	595	66
8L	.20	42	34	52	4
9L	.235	55	38	74	6
10L	.15	39	31	50	3

Figure 6-121. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.012

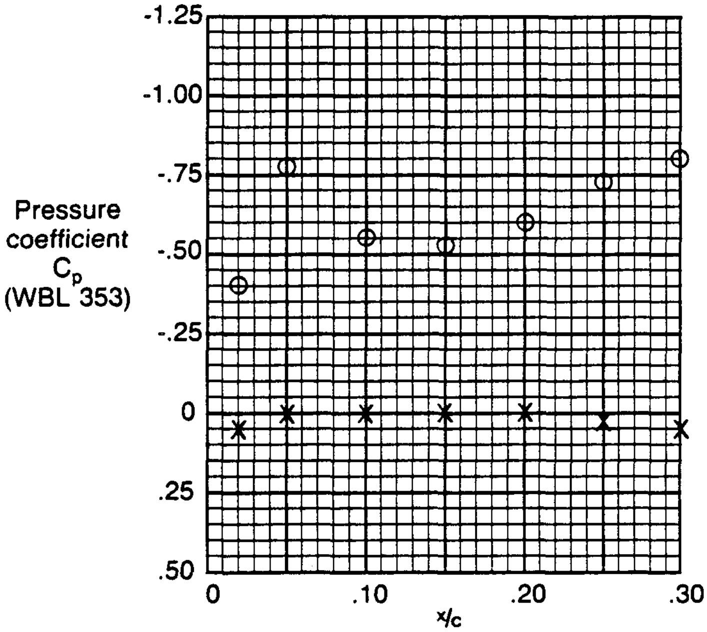


Mach No. = .801
Altitude = 37 563 ft
C_L = .478
β = -0.1 deg
α_B = 2.55 deg
$N_{1_{E2}}$ = 3679 r/min

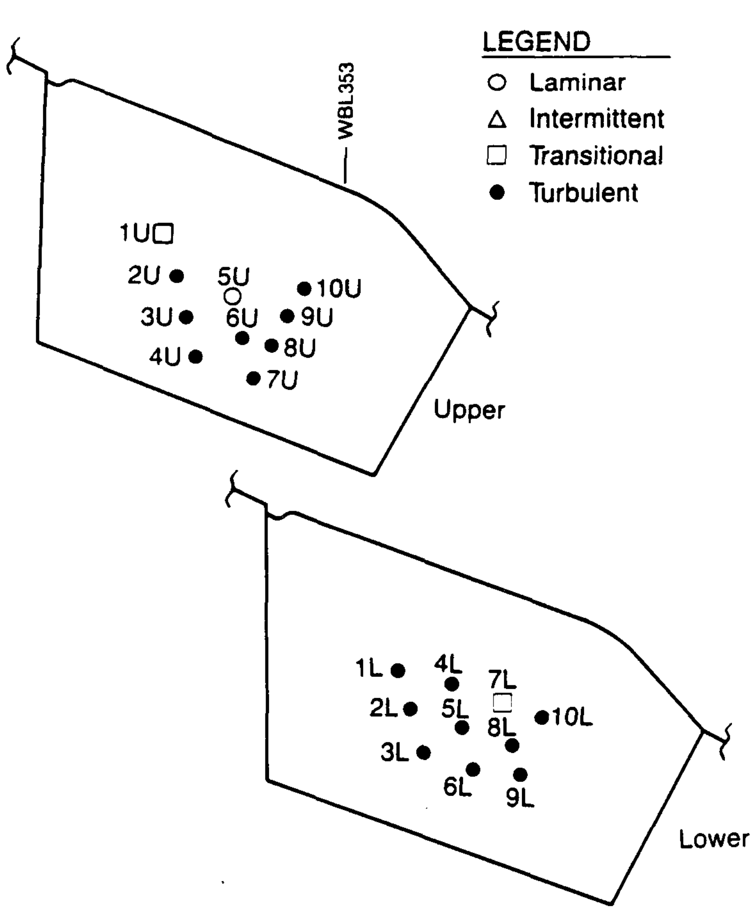


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	341	287	394	22
2U	.20	38	33	46	3
3U	.25	45	40	53	3
4U	.30	38	32	43	2
5U	.20	8	8	9	1
6U	.25	41	36	48	2
7U	.30	42	34	52	4
8U	.25	43	36	56	4
9U	.20	36	30	44	3
10U	.15	41	33	52	3
Lower					
1L	.15	37	29	60	4
2L	.20	46	37	57	4
3L	.25	45	37	56	4
4L	.15	33	20	98	14
5L	.20	24	20	30	2
6L	.25	37	31	45	2
7L	.15	514	422	641	50
8L	.20	41	33	51	3
9L	.235	53	40	67	6
10L	.15	38	27	46	3

Figure 6-122. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.013

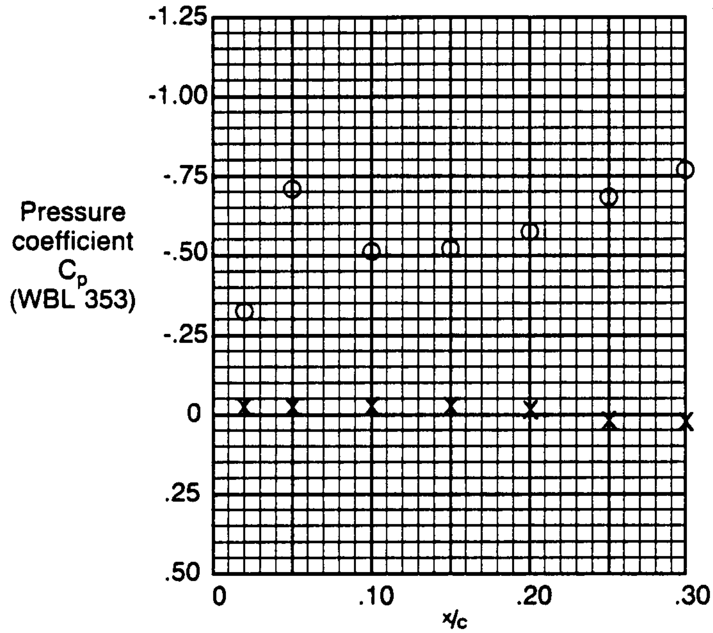


Mach No. = .819
Altitude = 39 460 ft
C_L = .498
β = -0.1 deg
α_B = 2.54 deg
$N_{1_{E2}}$ = 3861 r/min

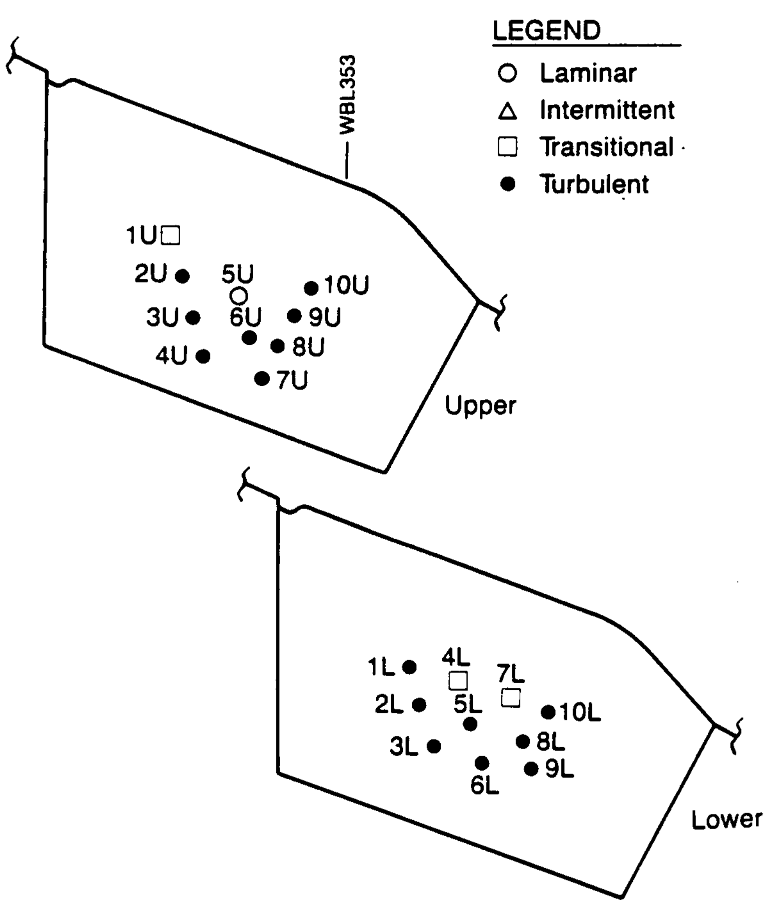


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	219	171	299	27
2U	.20	36	29	45	3
3U	.25	43	36	55	3
4U	.30	37	31	42	3
5U	.20	8	8	8	0
6U	.25	37	32	43	2
7U	.30	38	33	47	3
8U	.25	39	30	46	3
9U	.20	35	30	41	2
10U	.15	39	31	48	3
Lower					
1L	.15	33	24	45	3
2L	.20	43	35	54	4
3L	.25	43	35	55	3
4L	.15	22	16	57	7
5L	.20	23	19	27	1
6L	.25	35	29	46	3
7L	.15	488	357	595	50
8L	.20	39	30	47	3
9L	.235	50	39	63	5
10L	.15	37	31	45	3

Figure 6-123. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.014

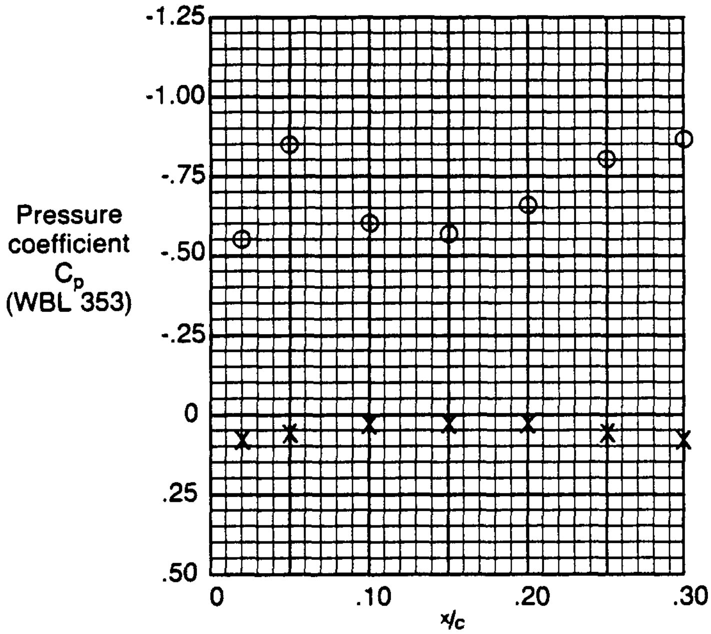


Mach No. = .829
Altitude = 39 459 ft
C_L = .484
β = -0.2 deg
α_B = 2.41 deg
$N_{1_{E2}}$ = 3953 r/min

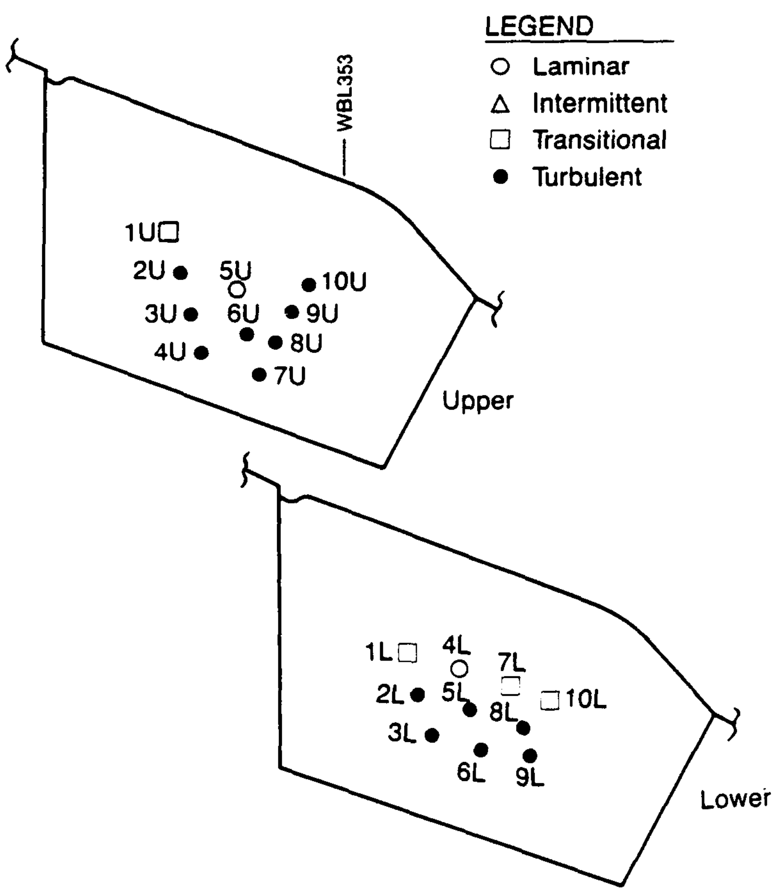


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	176	62	400	77
2U	.20	35	30	44	2
3U	.25	43	37	51	3
4U	.30	44	38	52	3
5U	.20	8	7	8	0
6U	.25	35	32	42	2
7U	.30	37	32	45	3
8U	.25	38	32	48	3
9U	.20	34	29	42	3
10U	.15	38	31	47	3
Lower					
1L	.15	39	33	46	3
2L	.20	47	40	57	4
3L	.25	44	35	55	4
4L	.15	118	36	264	49
5L	.20	22	19	27	1
6L	.25	36	30	43	2
7L	.15	189	65	363	64
8L	.20	39	30	49	3
9L	.235	50	43	63	5
10L	.15	38	31	45	3

Figure 6-124. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.015

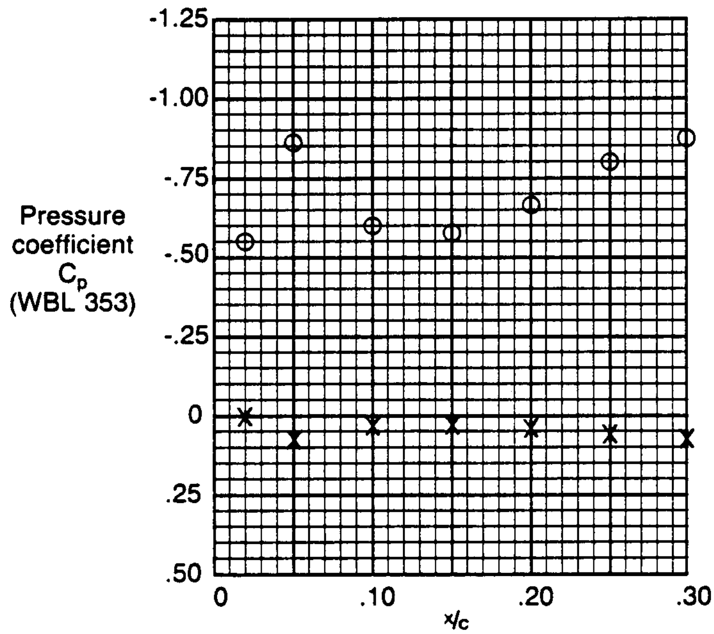


Mach No.	=	.800
Altitude	=	39 960 ft
C_L	=	.531
β	=	-0.2 deg
α_B	=	2.87 deg
$N_{1_{E2}}$	=	3962 r/min

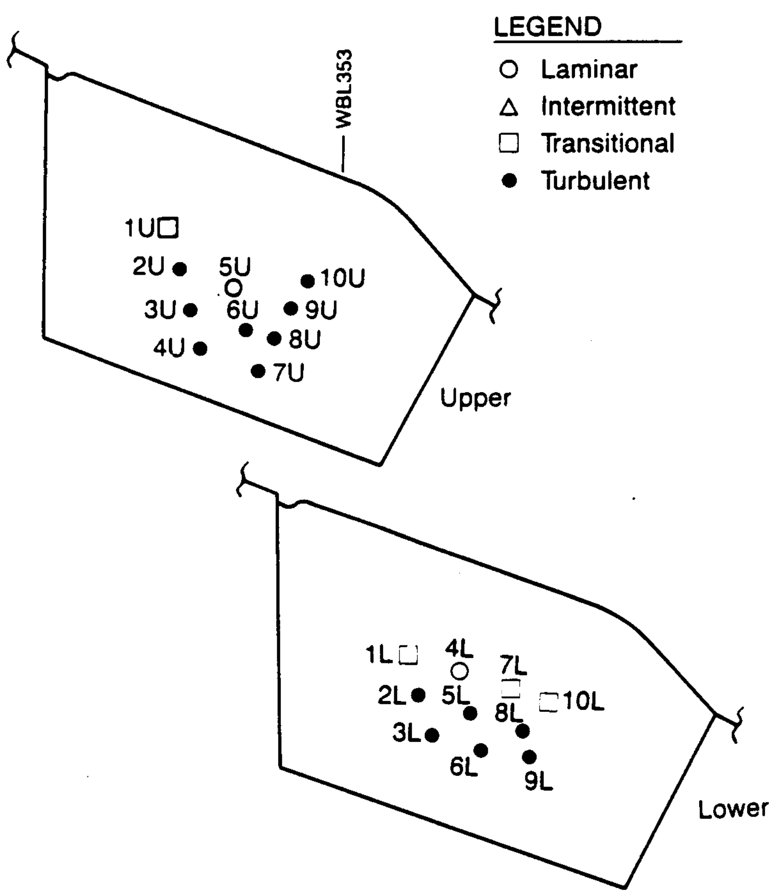


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	272	227	334	23
2U	.20	37	30	44	3
3U	.25	41	35	48	3
4U	.30	37	31	44	3
5U	.20	8	8	9	1
6U	.25	39	34	47	3
7U	.30	36	29	46	3
8U	.25	41	32	50	3
9U	.20	35	29	42	3
10U	.15	35	29	45	3
Lower					
1L	.15	67	34	192	30
2L	.20	50	38	90	9
3L	.25	43	36	50	3
4L	.15	15	13	68	5
5L	.20	23	19	28	2
6L	.25	34	28	41	3
7L	.15	269	146	384	52
8L	.20	38	31	49	3
9L	.235	47	36	64	5
10L	.15	65	34	138	22

Figure 6-125. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.016

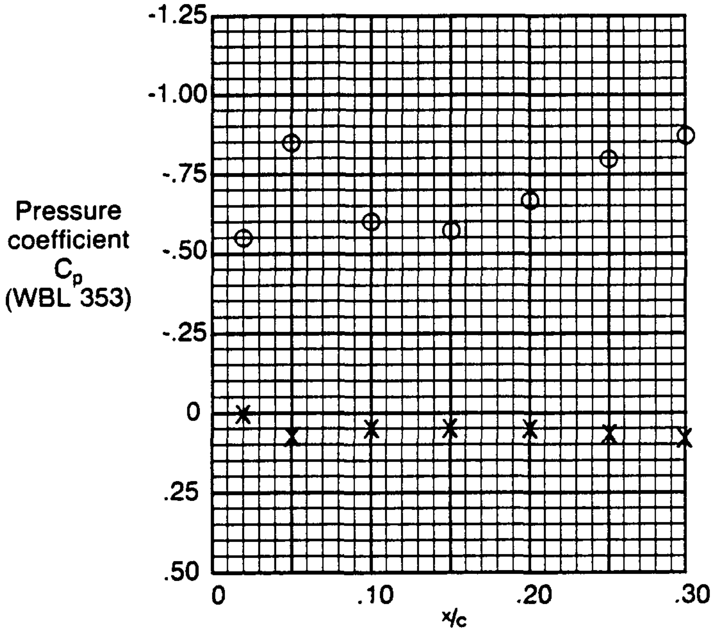


Mach No. = .800
Altitude = 39 961 ft
C_L = .531
β = -0.1 deg
α_B = 2.90 deg
$N_{1_{E2}}$ = 3768 r/min

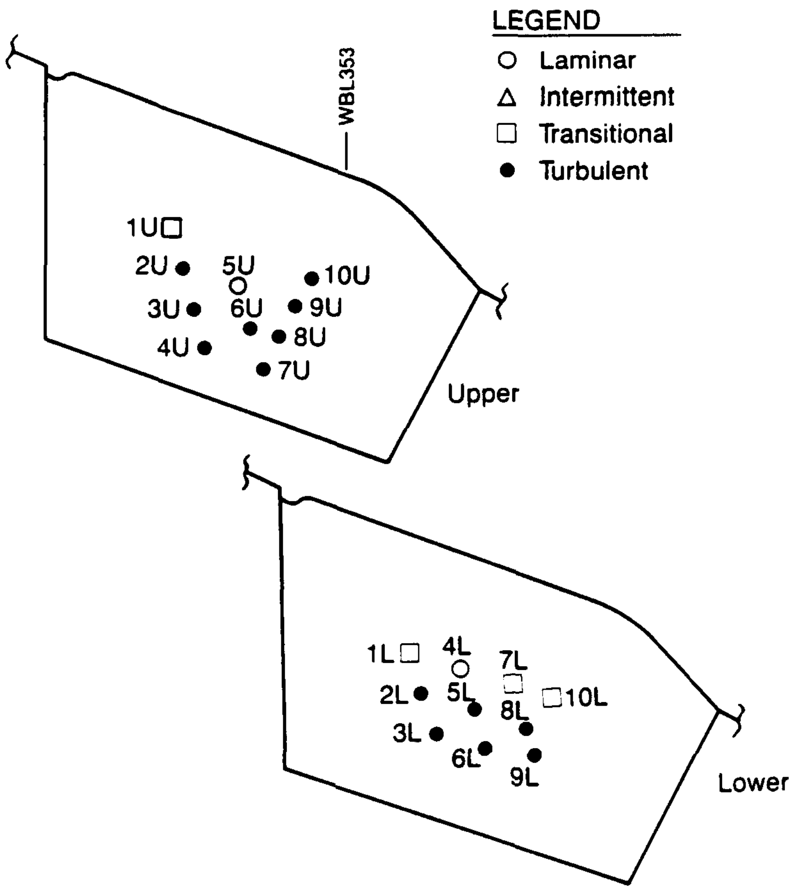


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	253	211	319	22
2U	.20	37	30	45	3
3U	.25	40	34	48	3
4U	.30	35	31	42	2
5U	.20	9	8	9	1
6U	.25	39	34	45	2
7U	.30	36	28	42	3
8U	.25	41	35	56	4
9U	.20	36	31	45	3
10U	.15	35	29	42	3
Lower					
1L	.15	205	124	306	42
2L	.20	47	36	104	10
3L	.25	41	36	49	3
4L	.15	14	11	15	1
5L	.20	23	20	29	2
6L	.25	33	29	41	2
7L	.15	141	46	312	54
8L	.20	38	32	47	3
9L	.235	47	37	61	5
10L	.15	115	59	222	38

Figure 6-126. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.017

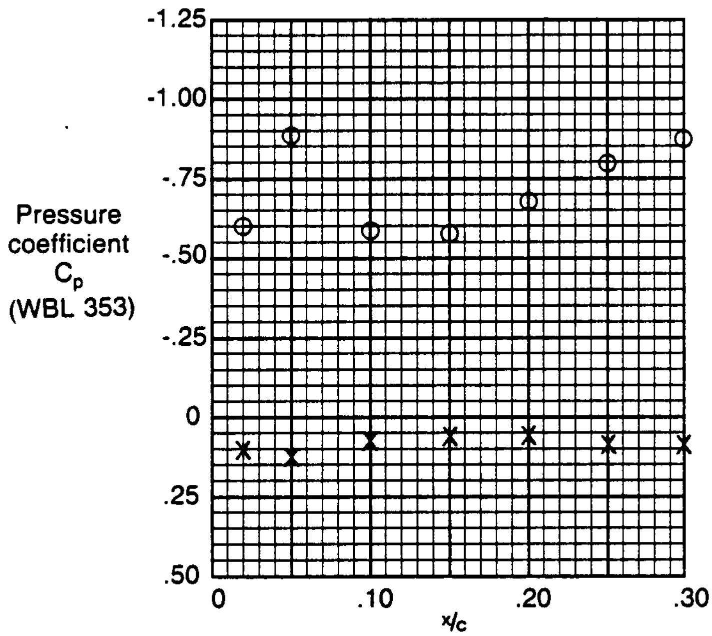


Mach No. = .800
Altitude = 40 065 ft
C_L = .532
β = +0.4 deg
α_B = 2.89 deg
N_{1E2} = 3690 r/min

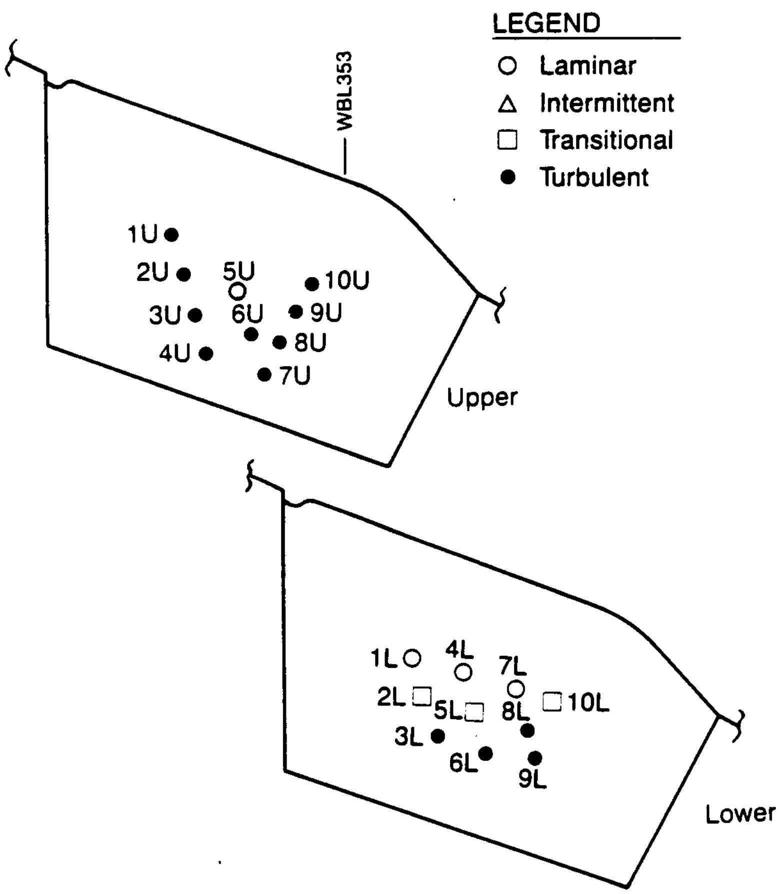


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	212	161	282	23
2U	.20	37	31	41	2
3U	.25	40	34	47	2
4U	.30	34	28	39	2
5U	.20	8	8	9	0
6U	.25	38	33	45	2
7U	.30	36	31	43	3
8U	.30	41	32	51	3
9U	.20	35	29	43	3
10U	.15	34	29	42	2
Lower					
1L	.15	442	354	546	35
2L	.20	39	32	82	6
3L	.25	41	34	53	3
4L	.15	14	12	15	1
5L	.20	23	20	48	3
6L	.25	33	27	38	2
7L	.15	53	23	252	33
8L	.20	38	31	49	3
9L	.235	46	38	58	4
10L	.15	226	98	452	63

Figure 6-127. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.018

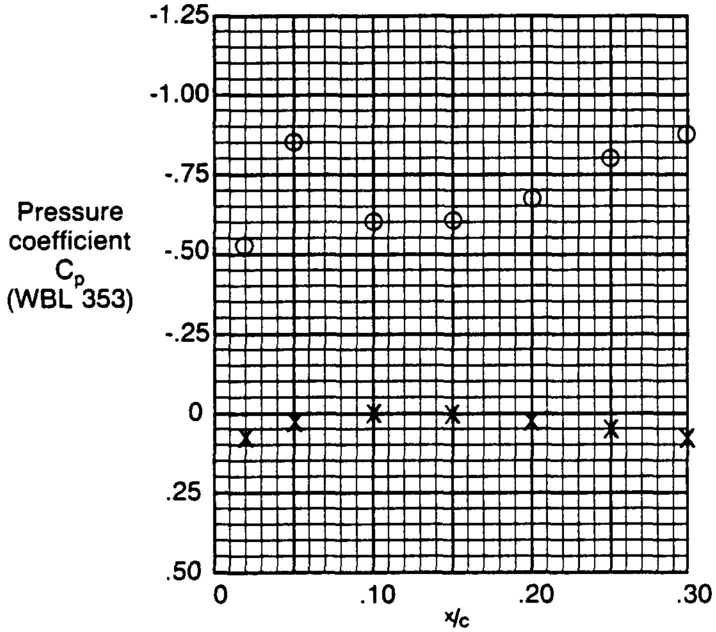


Mach No. = .802
Altitude = 40 091 ft
C_L = .531
β = +3.6 deg
α_B = 3.11 deg
$N_{1_{E2}}$ = 3840 r/min

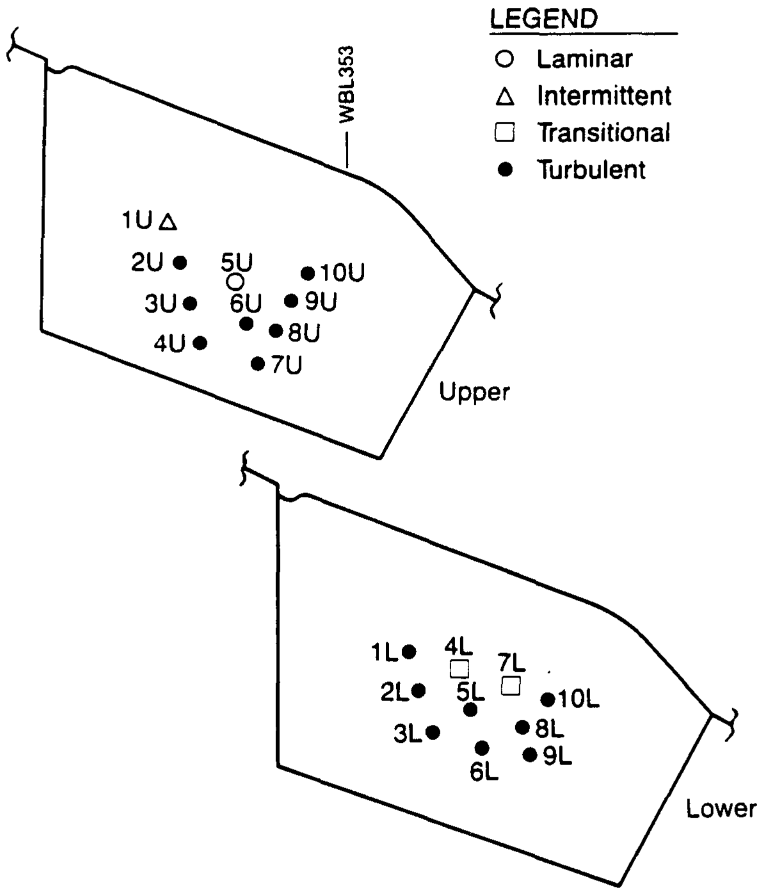


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	31	26	37	2
2U	.20	36	31	44	2
3U	.25	37	31	44	3
4U	.30	37	30	44	2
5U	.20	19	15	28	2
6U	.25	41	36	50	3
7U	.30	38	33	46	3
8U	.25	42	33	52	3
9U	.20	35	28	43	3
10U	.15	35	29	42	2
Lower					
1L	.15	11	9	14	1
2L	.20	229	108	382	57
3L	.25	39	33	49	3
4L	.15	12	11	15	1
5L	.20	228	193	263	16
6L	.25	32	27	39	3
7L	.15	14	12	15	1
8L	.20	46	32	131	15
9L	.235	43	36	57	4
10L	.15	288	122	437	70

Figure 6-128. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.019



Mach No. = .800
Altitude = 40 086 ft
C_L = .532
β = -3.7 deg
α_B = 3.27 deg
$N_{1_{E2}}$ = 3898 r/min



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	36	5	434	94
2U	.20	34	29	40	2
3U	.25	45	38	53	3
4U	.30	44	39	53	3
5U	.20	8	8	9	0
6U	.25	37	32	44	2
7U	.30	37	29	47	3
8U	.25	37	28	49	4
9U	.20	35	30	44	3
10U	.15	34	29	42	3
Lower					
1L	.15	36	28	44	3
2L	.20	47	38	57	4
3L	.25	47	40	56	4
4L	.15	197	100	348	59
5L	.20	23	20	27	1
6L	.25	37	30	46	3
7L	.15	101	43	234	41
8L	.20	40	33	47	3
9L	.235	50	40	69	6
10L	.15	37	33	44	3

Figure 6-129. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.020

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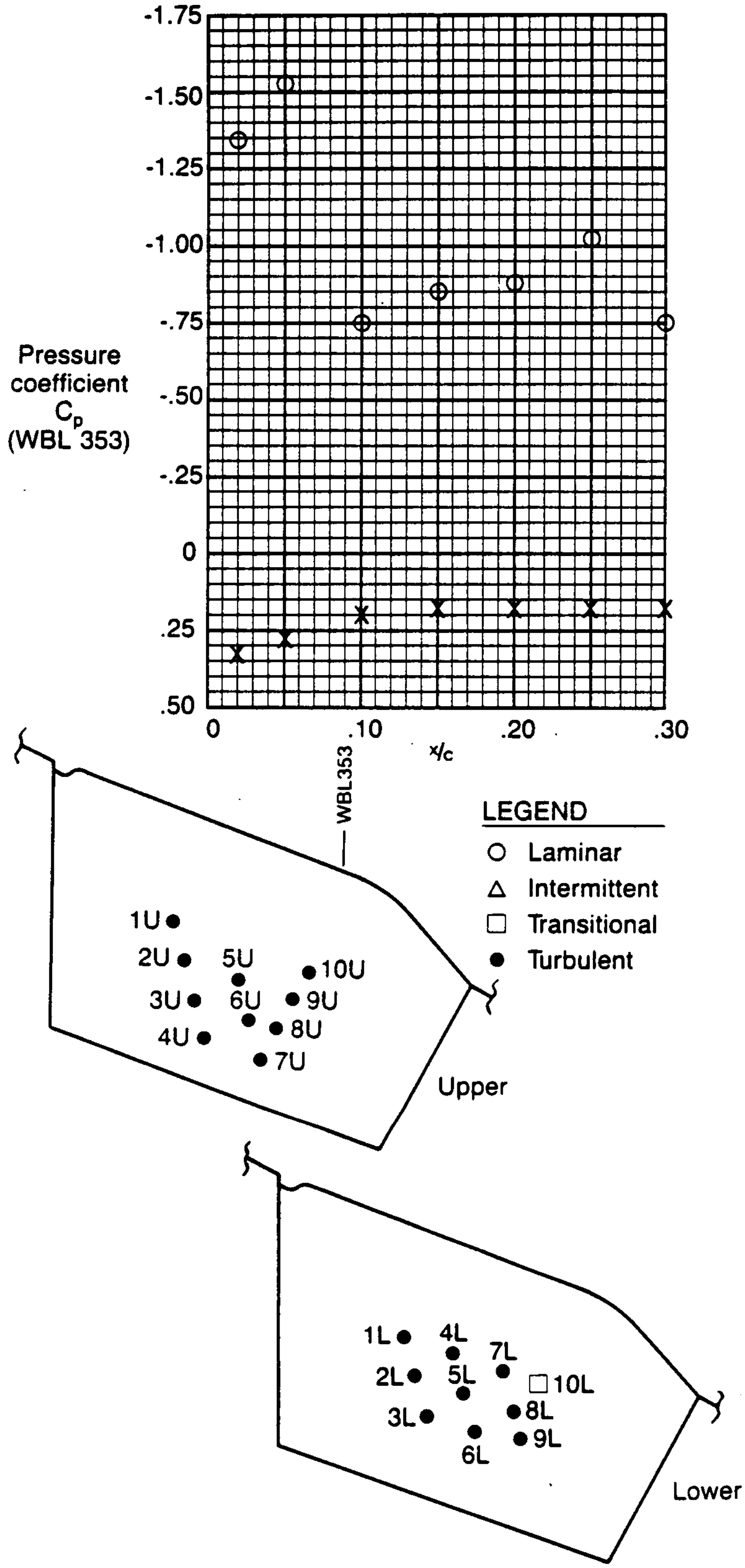
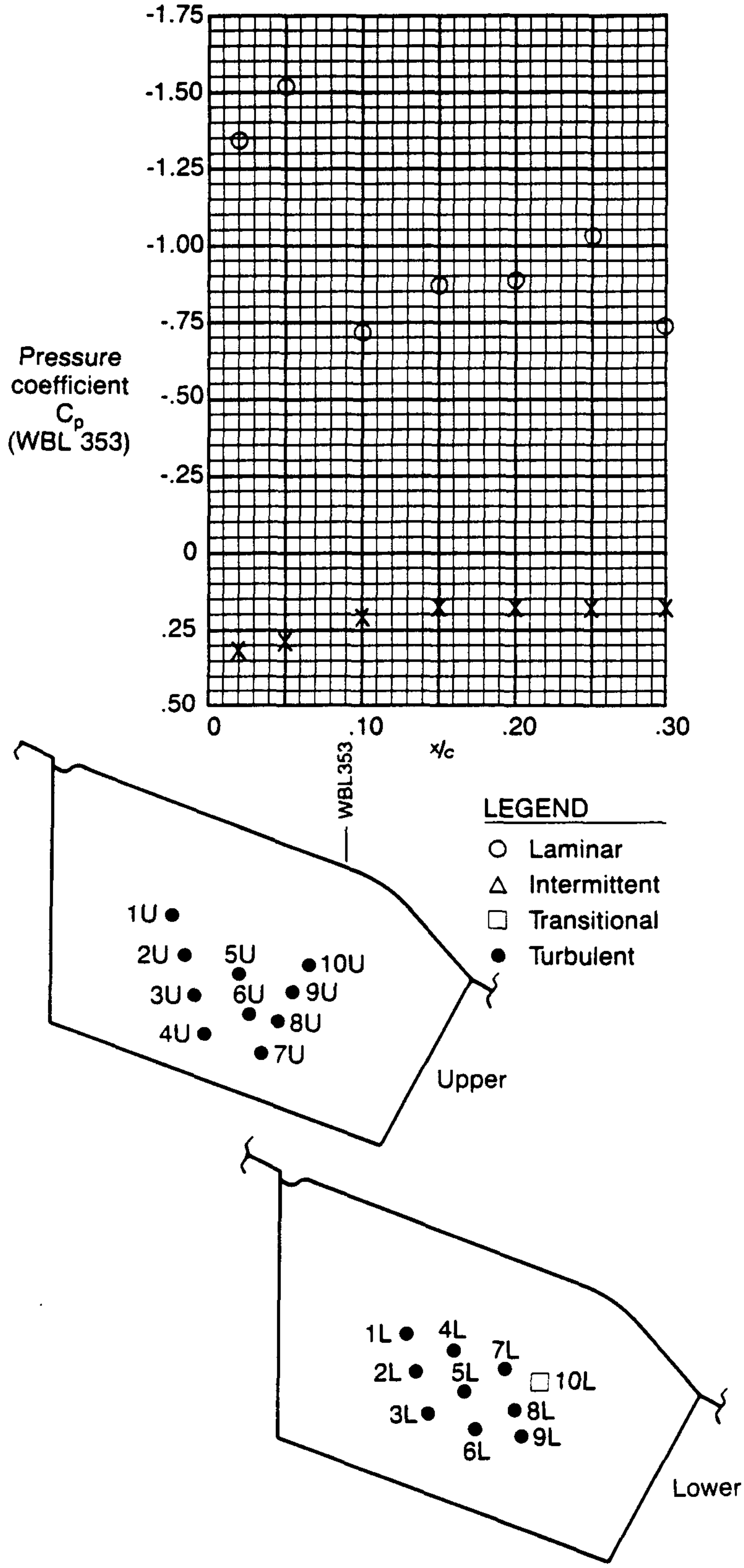


Mach No. = .700
Altitude = 38 592 ft
C_L = .644
β = -0.3 deg
α_B = 4.59 deg
$N_{1_{E2}}$ = 4048 r/min

Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	44	34	55	4
2U	.20	49	41	59	3
3U	.25	54	46	66	4
4U	.30	65	54	77	4
5U	.20	60	50	73	4
6U	.25	60	50	76	4
7U	.30	70	56	91	6
8U	.25	53	42	64	4
9U	.20	48	42	60	4
10U	.15	45	38	52	3
Lower					
1L	.15	34	28	41	3
2L	.20	48	37	61	4
3L	.25	52	43	64	4
4L	.15	38	32	44	3
5L	.20	25	22	30	2
6L	.25	39	33	47	3
7L	.15	43	36	52	3
8L	.20	46	39	57	4
9L	.235	58	46	71	5
10L	.15	213	95	318	54

Figure 6-130. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.021



Mach No. = .701
Altitude = 38 668 ft
C_L = .644
β = +0.2 deg
α_B = 4.56 deg
$N_{1_{E2}}$ = 3679 r/min

Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	47	40	56	4
2U	.20	48	40	58	4
3U	.25	54	43	63	4
4U	.30	65	52	77	5
5U	.20	59	51	71	4
6U	.25	59	51	71	4
7U	.30	65	52	80	7
8U	.25	52	39	62	5
9U	.20	48	40	56	4
10U	.15	44	38	52	3
Lower					
1L	.15	33	28	43	3
2L	.20	46	36	58	4
3L	.25	50	43	60	4
4L	.15	36	29	42	3
5L	.20	25	21	29	2
6L	.25	37	32	45	2
7L	.15	39	33	47	3
8L	.20	45	38	54	3
9L	.235	55	41	70	5
10L	.15	251	38	400	77

Figure 6-131. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.022

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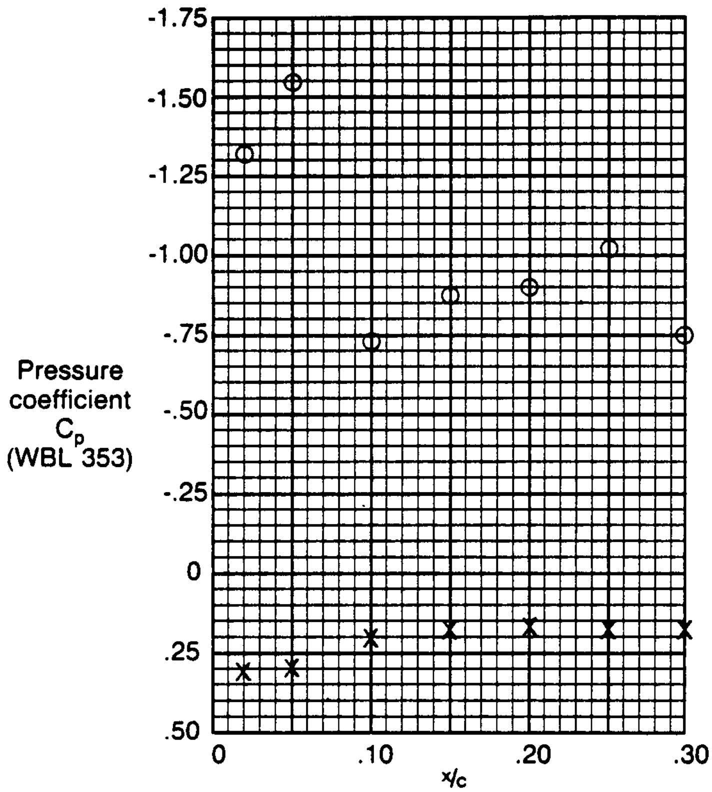
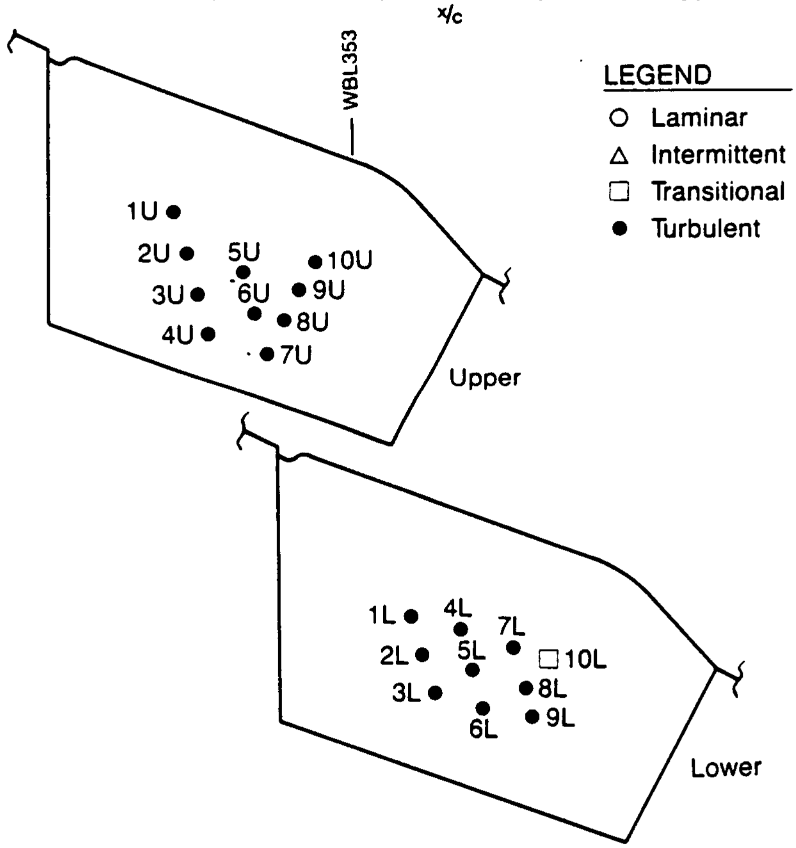
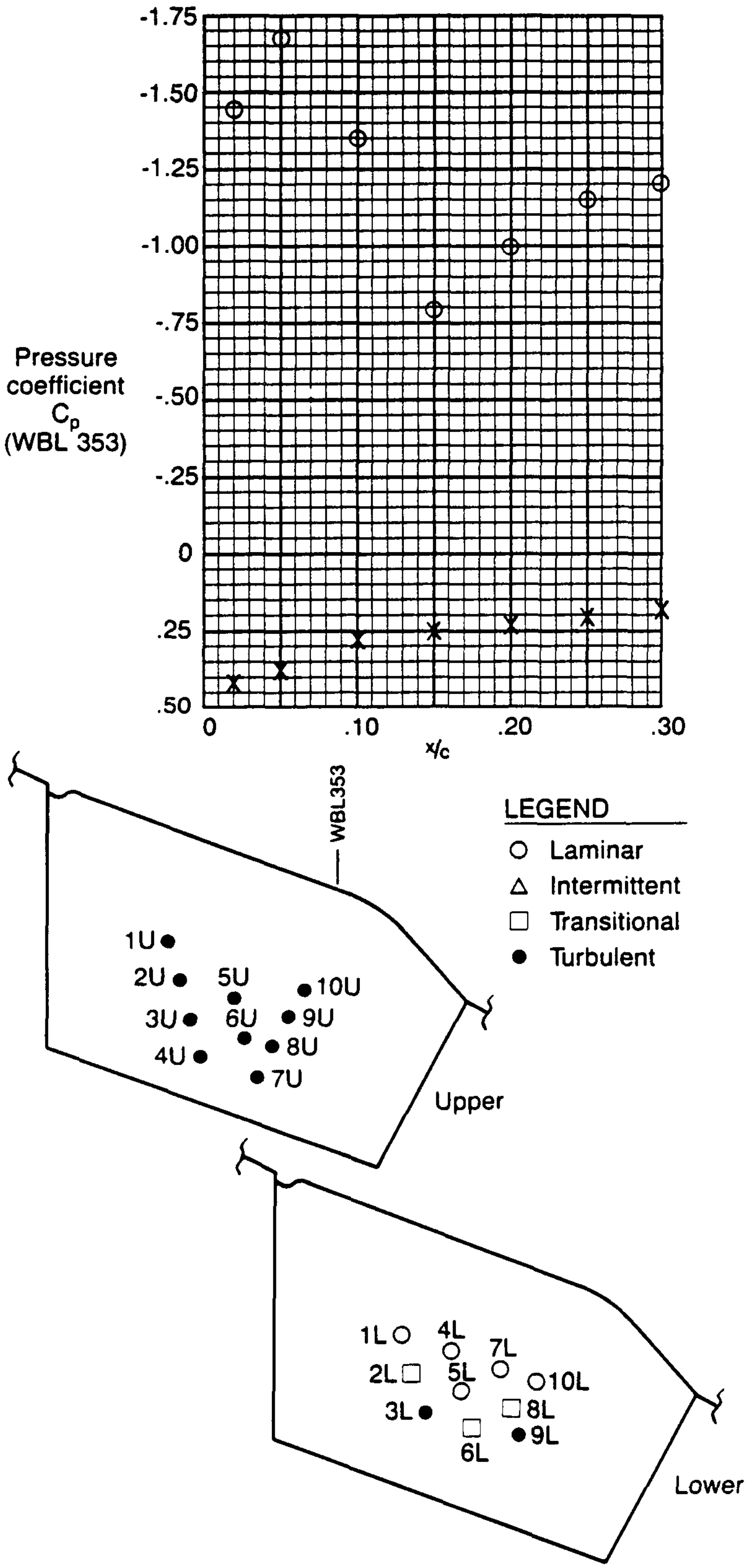


Mach No. = .699
Altitude = 38 670 ft
C_L = .647
β = +0.3 deg
α_B = 4.58 deg
$N_{1_{E2}}$ = 3332 r/min



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	46	39	53	3
2U	.20	49	38	65	4
3U	.25	54	43	64	4
4U	.30	65	54	77	5
5U	.20	59	49	69	4
6U	.25	60	50	70	4
7U	.30	69	57	86	6
8U	.25	51	43	61	4
9U	.20	49	40	61	4
10U	.15	45	37	57	4
Lower					
1L	.15	33	26	42	3
2L	.20	45	36	54	3
3L	.25	50	39	57	4
4L	.15	34	26	42	3
5L	.20	24	21	28	1
6L	.25	37	31	46	3
7L	.15	38	31	44	2
8L	.20	45	38	58	4
9L	.235	53	43	70	5
10L	.15	307	61	606	104

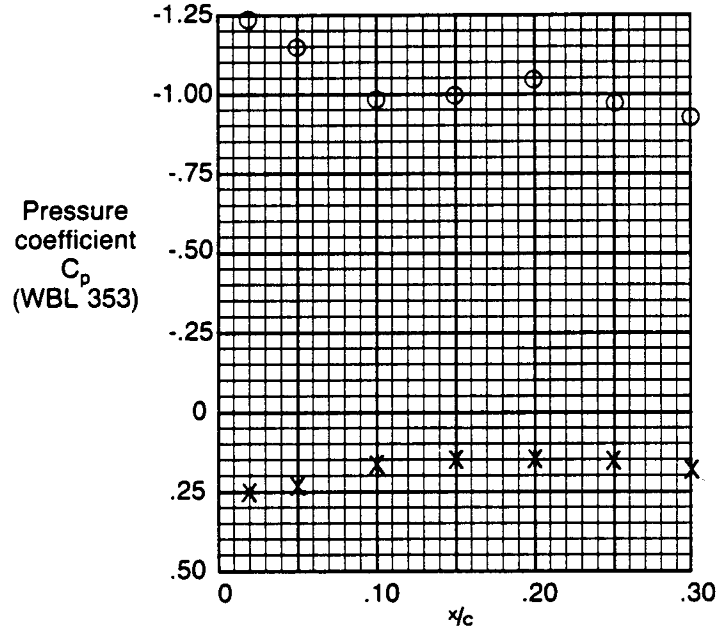
Figure 6-132. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.023



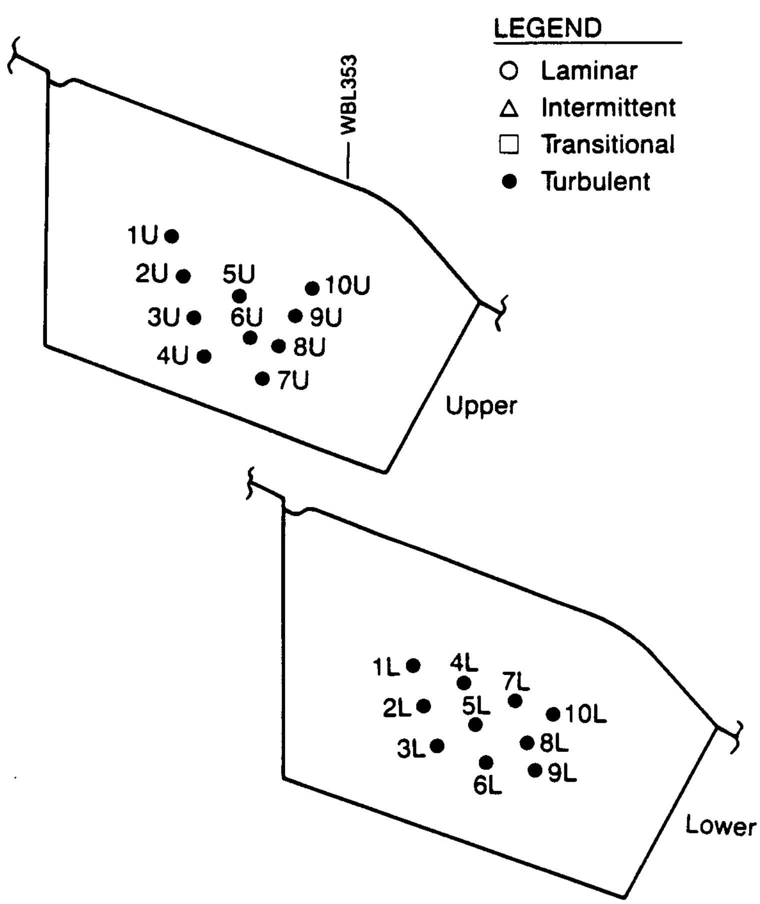
Mach No. = .700
Altitude = 38 615 ft
C_L = .643
β = +6.4 deg
α_B = 5.14 deg
$N_{1_{E2}}$ = 3339 r/min

Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	39	34	47	3
2U	.20	56	31	97	17
3U	.25	59	48	73	5
4U	.30	60	50	71	4
5U	.20	61	54	71	4
6U	.25	60	53	73	4
7U	.30	53	44	66	5
8U	.25	53	41	64	4
9U	.20	51	42	65	5
10U	.15	54	46	66	5
Lower					
1L	.15	4	3	8	1
2L	.20	172	30	377	104
3L	.25	38	32	46	3
4L	.15	6	5	8	1
5L	.20	7	6	20	1
6L	.25	90	26	360	104
7L	.15	7	6	15	1
8L	.20	205	9	421	114
9L	.235	45	36	63	5
10L	.15	6	6	7	0

Figure 6-133. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.024

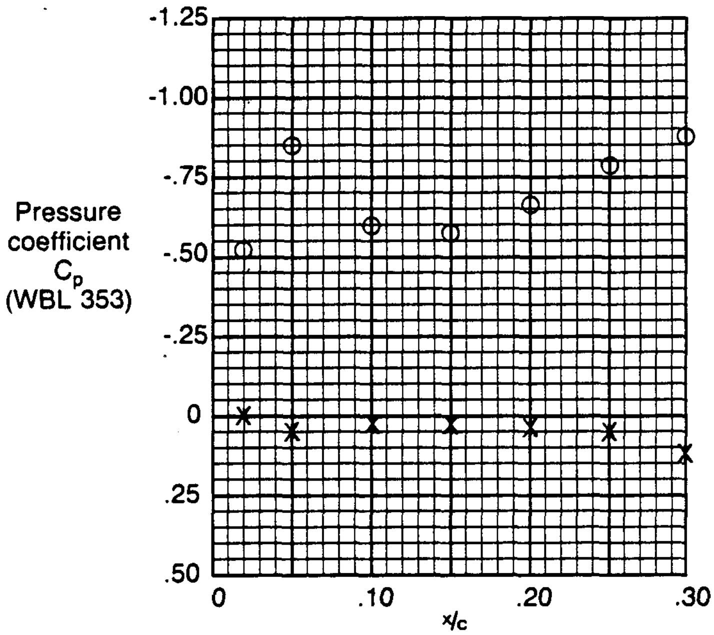


Mach No. = .700
Altitude = 38 790 ft
C_L = .647
β = -6.0 deg
α_B = 5.29 deg
$N_{1_{E2}}$ = 3961 r/min

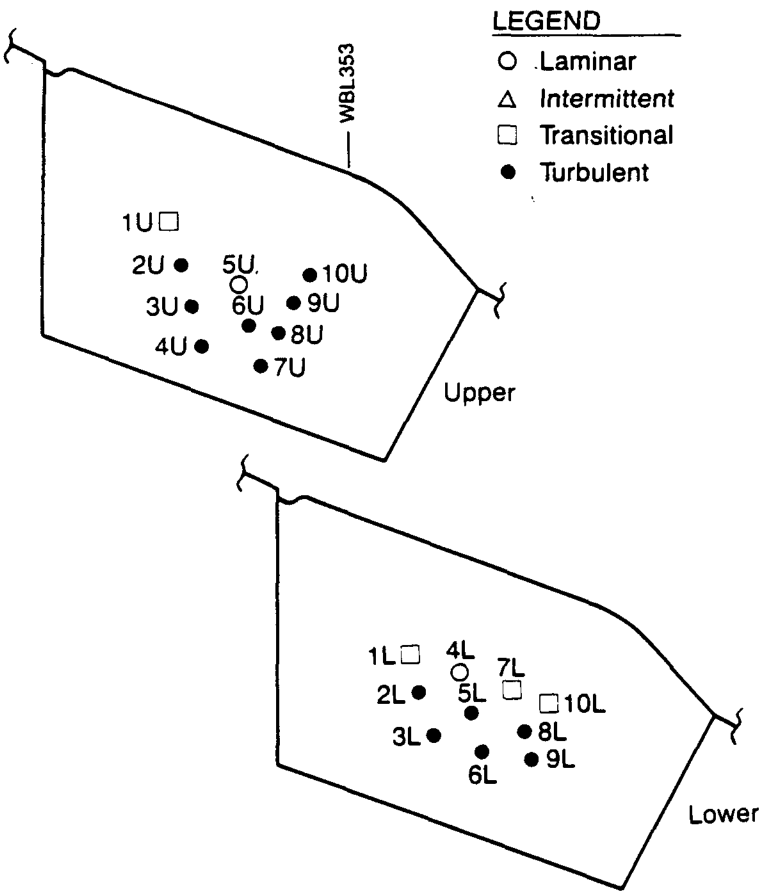


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	40	34	46	3
2U	.20	46	38	55	3
3U	.25	57	46	66	4
4U	.30	63	51	82	5
5U	.20	60	50	74	5
6U	.25	65	55	81	5
7U	.30	63	54	75	5
8U	.25	59	49	77	5
9U	.20	52	40	61	4
10U	.15	45	38	54	3
Lower					
1L	.15	38	30	45	3
2L	.20	52	44	65	4
3L	.25	55	45	69	5
4L	.15	43	35	51	3
5L	.20	28	24	34	2
6L	.25	41	37	49	3
7L	.15	48	38	56	4
8L	.20	50	42	62	4
9L	.235	60	45	74	6
10L	.15	48	40	59	4

Figure 6-134. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.025

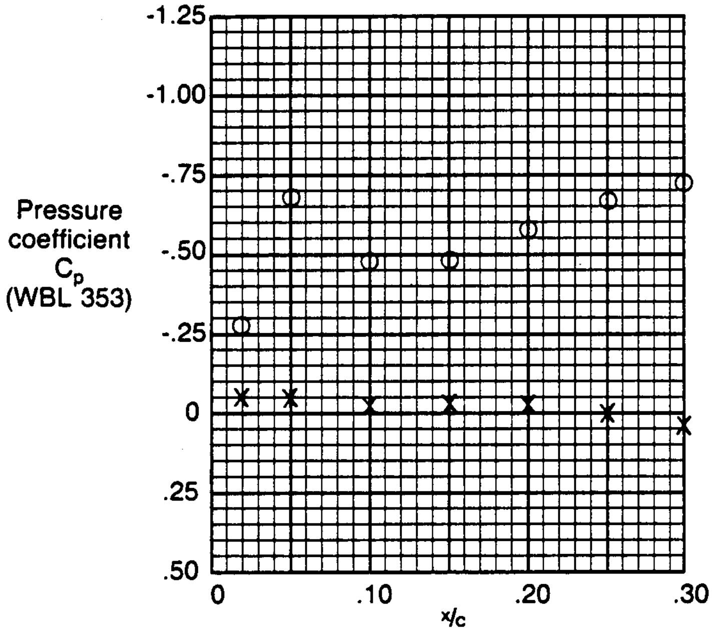


Mach No.	=	.798
Altitude	=	38 806 ft
C_L	=	.497
β	=	+0.2 deg
α_B	=	2.70 deg
$N_{1_{E2}}$	=	3737 r/min

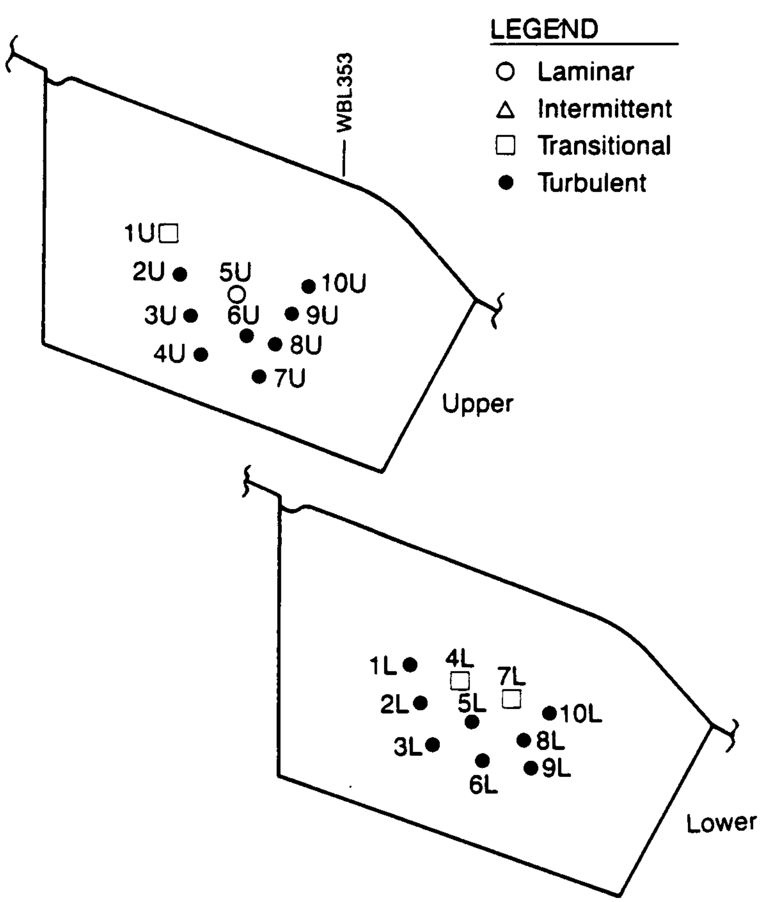


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	277	220	375	28
2U	.20	36	30	40	2
3U	.25	42	37	49	3
4U	.30	35	30	41	2
5U	.20	11	8	17	2
6U	.25	38	33	46	2
7U	.30	40	34	49	3
8U	.25	38	32	46	3
9U	.20	38	82	44	3
10U	.15	36	30	43	3
Lower					
1L	.15	421	283	532	52
2L	.20	46	31	126	14
3L	.25	38	33	50	3
4L	.15	14	12	18	1
5L	.20	24	19	47	4
6L	.25	32	28	38	2
7L	.15	67	27	214	38
8L	.20	36	30	44	3
9L	.235	45	36	56	4
10L	.15	201	61	411	77

Figure 6-135. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.026

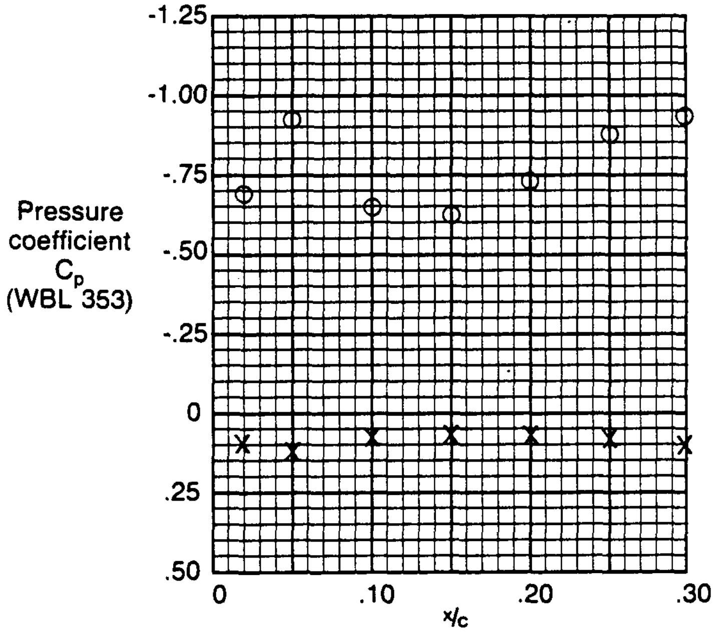


Mach No. = .824
Altitude = 37 973 ft
C_L = .447
β = 0.0 deg
α_B = 2.10 deg
$N_{1_{E2}}$ = 3782 r/min

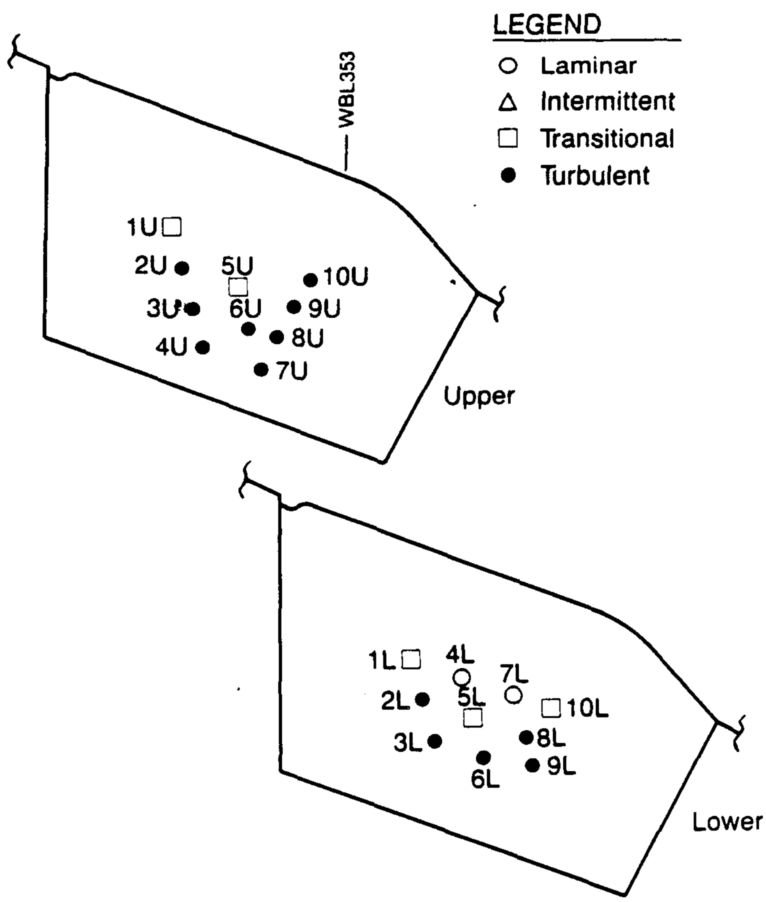


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	108	24	311	76
2U	.20	34	29	43	2
3U	.25	44	37	51	3
4U	.30	38	31	46	3
5U	.20	8	7	8	0
6U	.25	39	34	50	3
7U	.30	35	28	43	2
8U	.25	38	31	47	3
9U	.20	33	29	41	2
10U	.15	35	29	42	3
Lower					
1L	.15	39	30	49	3
2L	.20	51	43	62	4
3L	.25	45	37	54	4
4L	.15	147	52	321	58
5L	.20	21	18	25	1
6L	.25	35	29	41	2
7L	.15	130	50	295	47
8L	.20	38	31	48	3
9L	.235	49	40	61	4
10L	.15	37	31	44	3

Figure 6-136. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.027

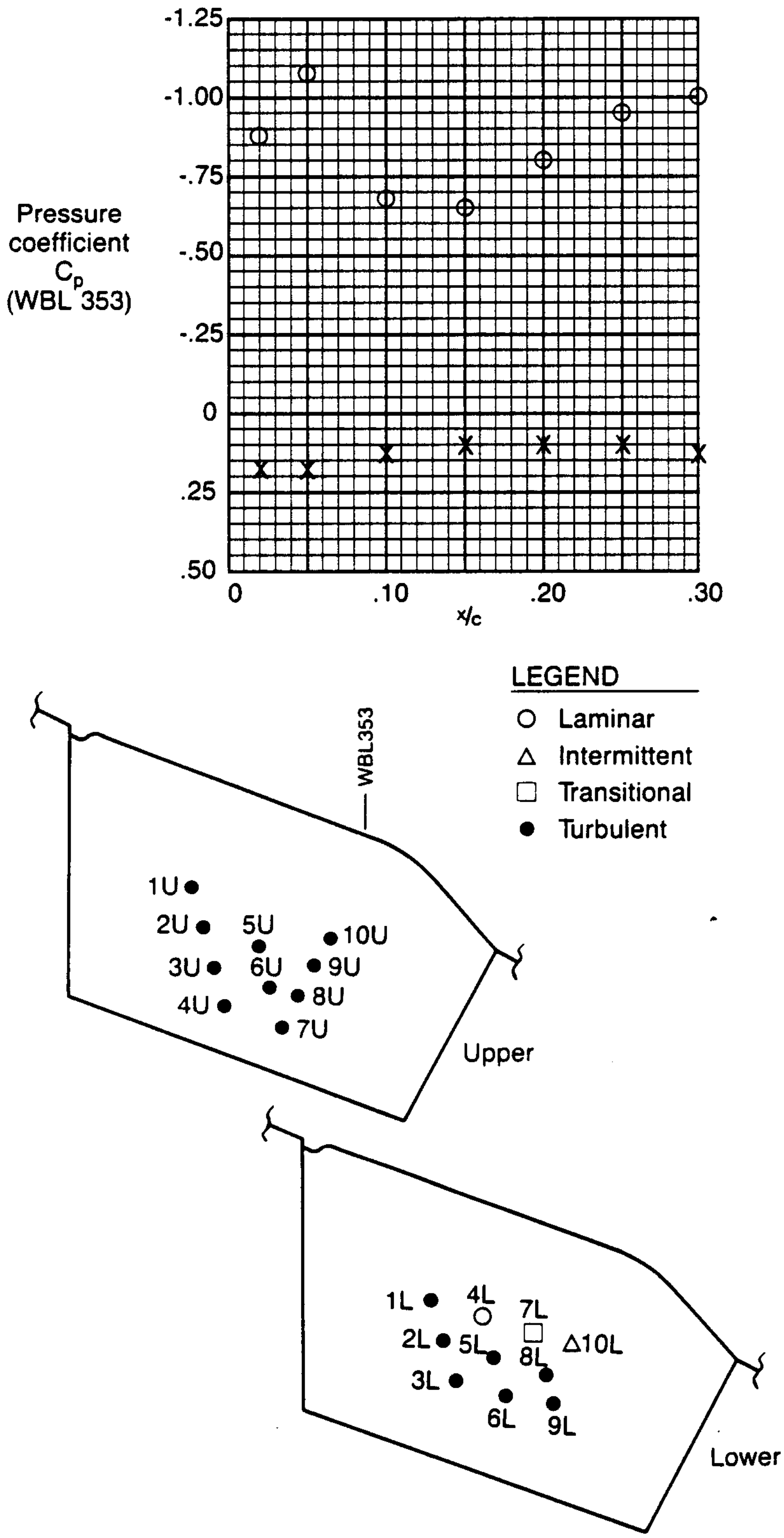


Mach No.	=	.777
Altitude	=	39 167 ft
C_L	=	.531
β	=	+0.1 deg
α_B	=	3.05 deg
$N_{1_{E2}}$	=	3715 r/min



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	70	36	147	21
2U	.20	36	30	41	2
3U	.25	38	33	45	3
4U	.30	38	33	48	2
5U	.20	68	47	119	14
6U	.25	39	34	46	2
7U	.30	40	35	53	3
8U	.25	43	35	51	4
9U	.20	37	32	43	3
10U	.15	36	30	42	3
Lower					
1L	.15	412	318	520	42
2L	.20	37	28	43	3
3L	.25	39	33	46	3
4L	.15	11	10	13	1
5L	.20	36	20	99	13
6L	.25	31	26	37	2
7L	.15	17	13	73	6
8L	.20	36	29	44	3
9L	.235	43	35	60	4
10L	.15	318	121	495	65

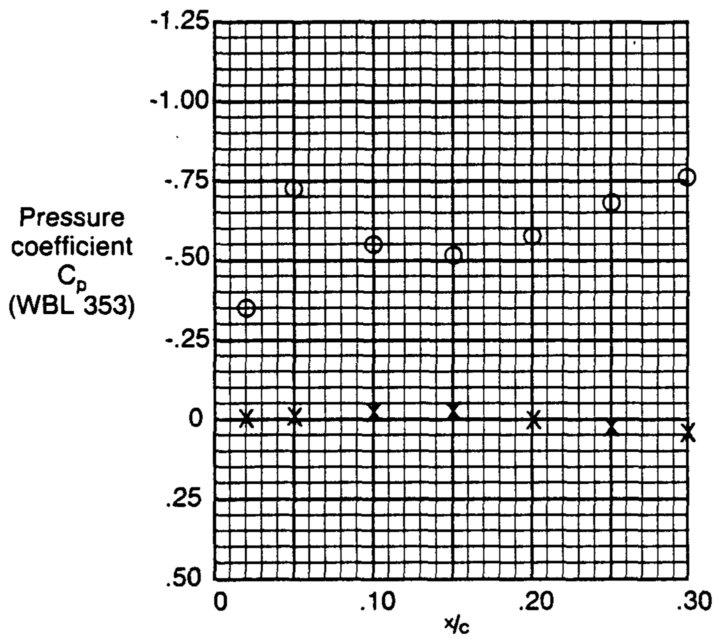
Figure 6-137. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.028



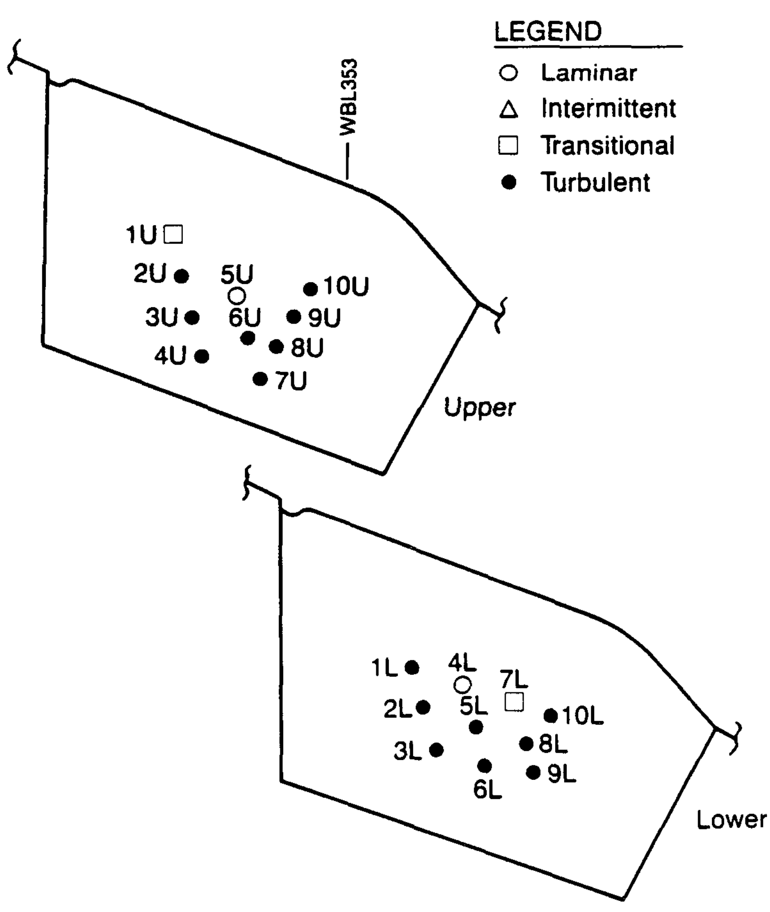
Mach No. = .752
Altitude = 39 176 ft
C_L = .567
β = +0.1 deg
α_B = 3.54 deg
$N_{1_{E2}}$ = 3707 r/min

Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	32	27	37	2
2U	.20	38	31	44	3
3U	.25	38	33	47	2
4U	.30	51	42	61	4
5U	.20	52	45	61	3
6U	.25	51	43	61	3
7U	.30	47	39	60	4
8U	.25	47	39	56	4
9U	.20	42	33	51	4
10U	.15	38	30	48	4
Lower					
1L	.15	39	30	84	8
2L	.20	42	34	52	4
3L	.25	41	33	48	3
4L	.15	13	12	16	1
5L	.20	25	19	48	6
6L	.25	35	29	45	3
7L	.15	112	53	237	40
8L	.20	34	27	42	3
9L	.235	44	35	57	5
10L	.15	19	14	58	6

Figure 6-138. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.029

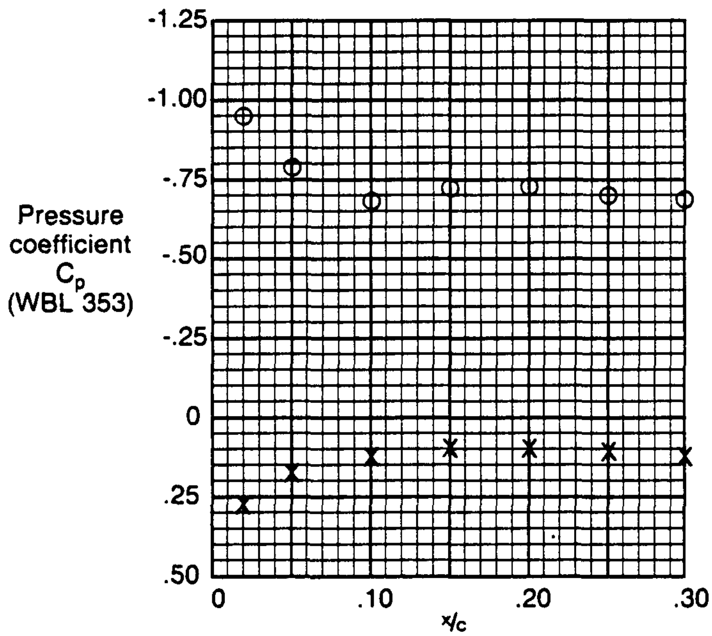


Mach No. = .827
Altitude = 40 353 ft
C_L = .493
β = -0.1 deg
α_B = 2.47 deg
$N_{1_{E2}}$ = 3995 r/min

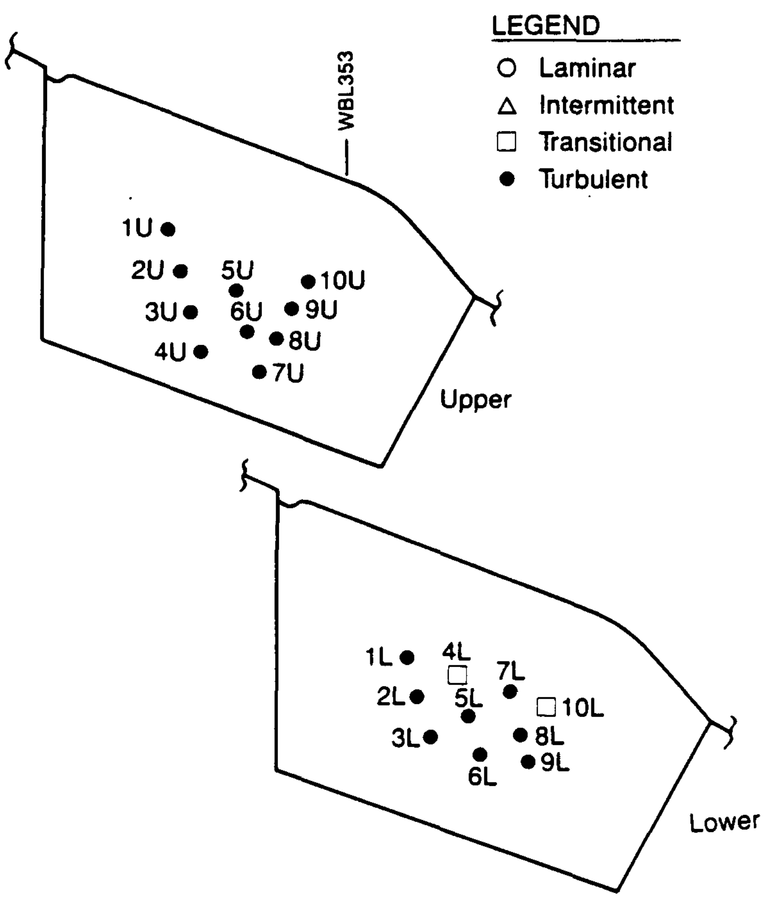


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	77	26	132	23
2U	.20	32	28	36	2
3U	.25	39	34	46	3
4U	.30	40	33	46	3
5U	.20	8	8	9	0
6U	.25	32	27	38	2
7U	.30	33	28	45	3
8U	.25	34	29	43	3
9U	.20	30	25	36	2
10U	.15	36	30	43	3
Lower					
1L	.15	35	25	204	18
2L	.20	39	34	47	3
3L	.25	36	29	45	3
4L	.15	16	13	20	1
5L	.20	20	18	26	1
6L	.25	31	26	37	2
7L	.15	342	194	471	51
8L	.20	33	27	41	3
9L	.235	42	33	54	4
10L	.15	33	27	42	3

Figure 6-139. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.030

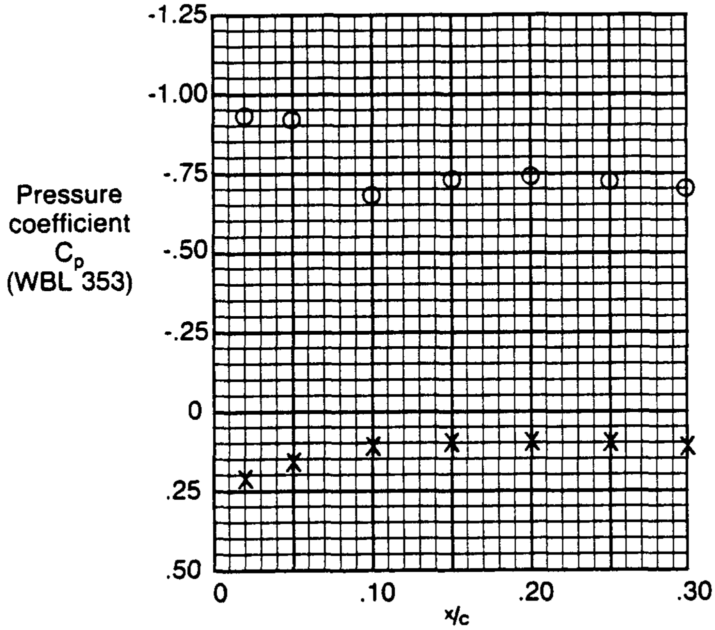


Mach No. = .700
Altitude = 34 694 ft
C_L = .522
β = -0.3 deg
α_B = 3.60 deg
$N_{1_{E2}}$ = 4078 r/min

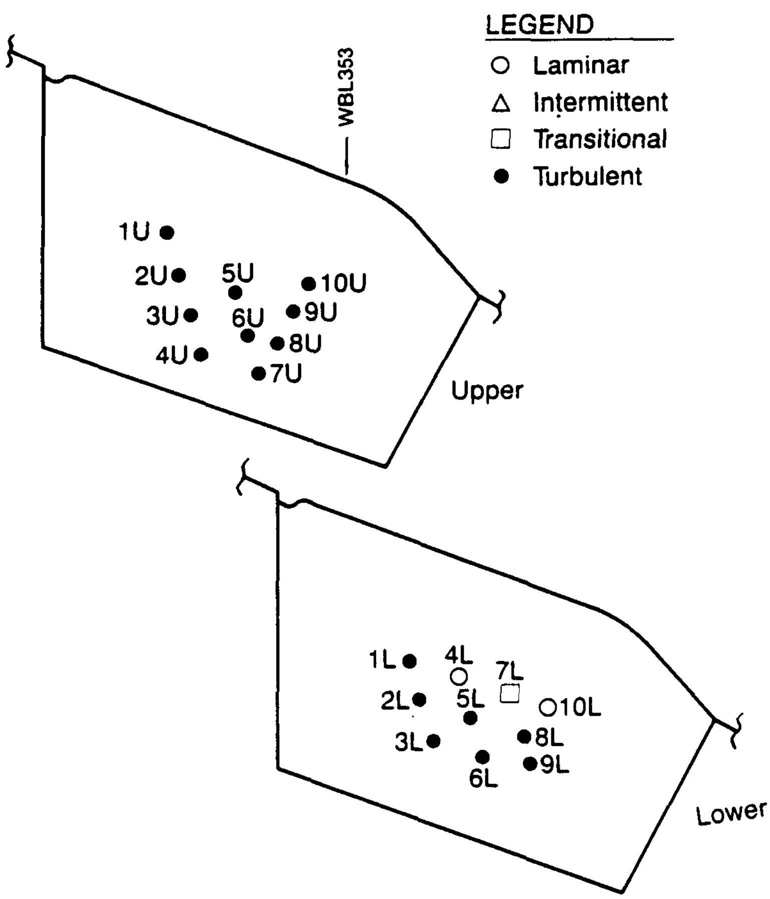


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	40	35	46	3
2U	.20	49	40	59	4
3U	.25	58	51	71	4
4U	.30	66	54	75	4
5U	.20	63	54	76	4
6U	.25	65	54	78	5
7U	.30	65	53	78	6
8U	.25	63	53	76	5
9U	.20	51	42	64	4
10U	.15	44	38	52	3
Lower					
1L	.15	32	26	38	3
2L	.20	49	40	58	4
3L	.25	51	43	63	4
4L	.15	464	296	582	62
5L	.20	25	22	29	2
6L	.25	41	36	47	3
7L	.15	37	31	44	3
8L	.20	41	32	50	3
9L	.235	52	40	64	4
10L	.15	226	125	369	53

Figure 6-140. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.031

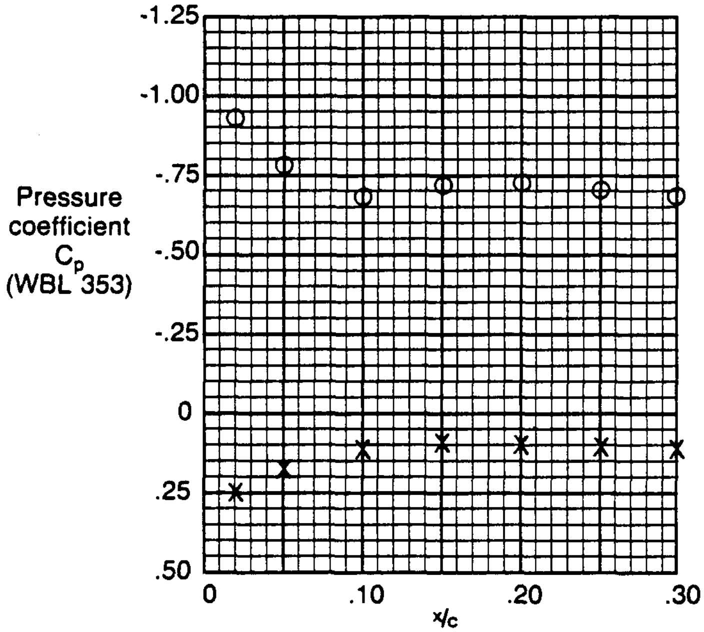


Mach No. = .703
Altitude = 34 697 ft
C_L = .517
β = +0.5 deg
α_B = 3.54 deg
$N_{1_{E2}}$ = 2669 r/min

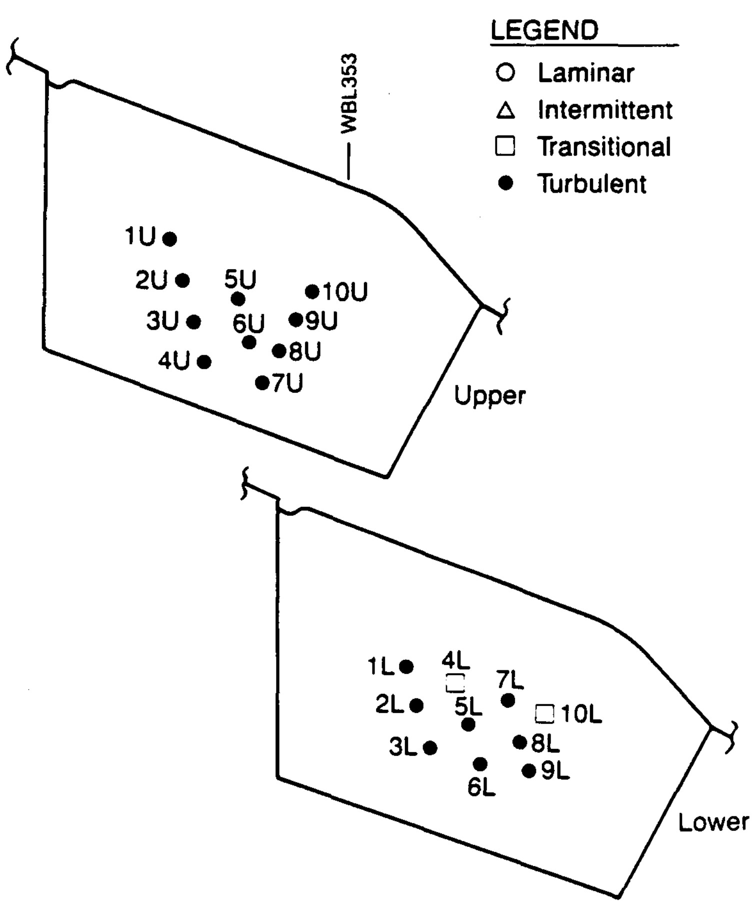


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	39	33	45	3
2U	.20	49	38	59	4
3U	.25	58	49	71	4
4U	.30	65	53	81	6
5U	.20	61	49	74	5
6U	.25	64	54	77	5
7U	.30	65	53	84	6
8U	.25	61	46	74	5
9U	.20	49	40	60	4
10U	.15	44	38	56	3
Lower					
1L	.15	31	23	38	3
2L	.20	45	38	58	4
3L	.25	48	40	62	4
4L	.15	7	5	8	1
5L	.20	21	18	26	1
6L	.25	39	32	48	3
7L	.15	211	31	470	87
8L	.20	36	30	44	3
9L	.235	49	38	68	5
10L	.15	12	7	32	5

Figure 6-141. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.032

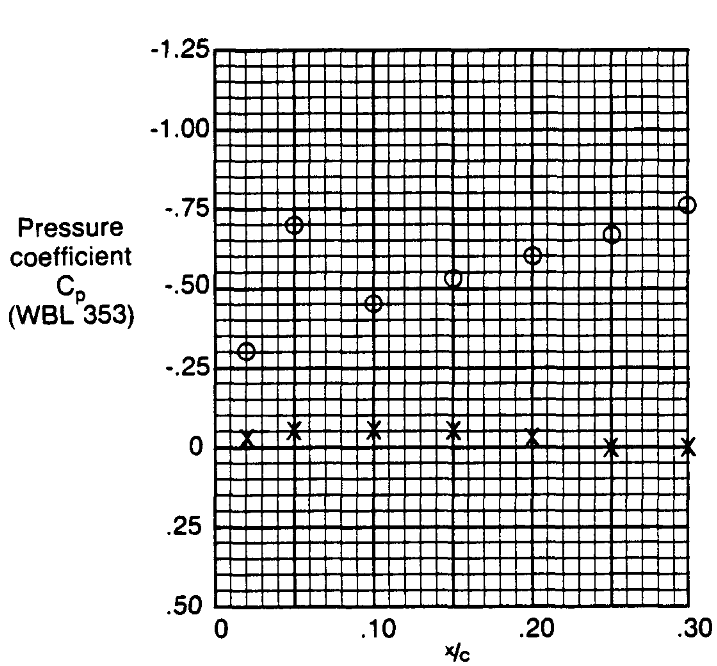


Mach No.	=	.703
Altitude	=	34 692 ft
C_L	=	.518
β	=	-0.1 deg
α_B	=	3.47 deg
$N_{1_{E2}}$	=	3501 r/min

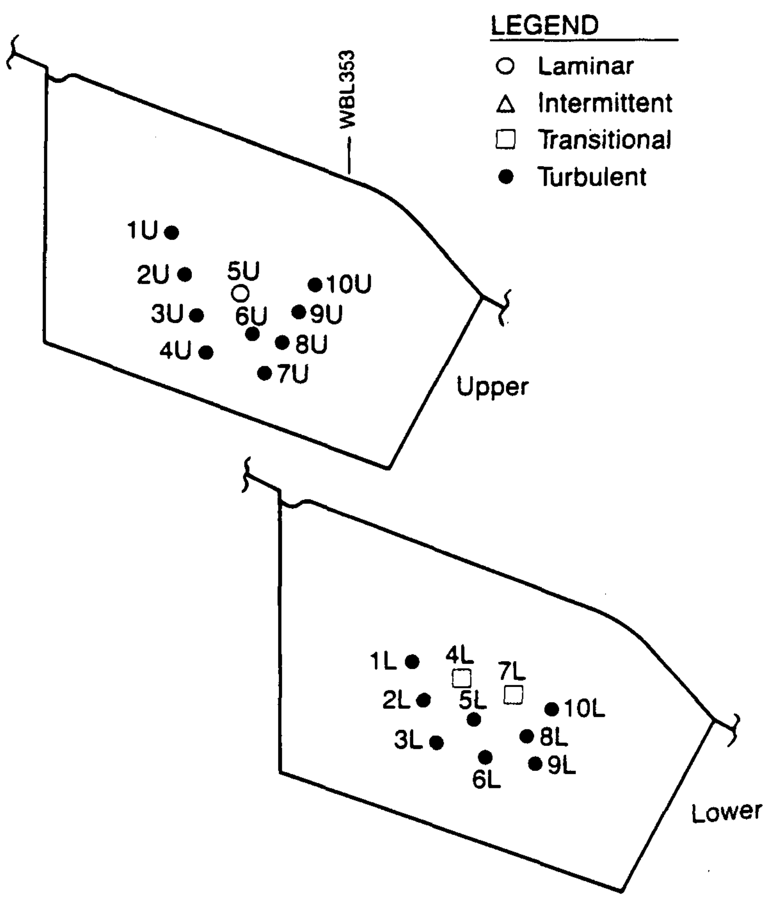


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	40	33	47	3
2U	.20	48	39	57	3
3U	.25	56	48	65	4
4U	.30	66	56	79	5
5U	.20	62	51	75	4
6U	.25	65	55	75	4
7U	.30	64	50	79	6
8U	.25	61	49	75	5
9U	.20	49	42	56	4
10U	.15	44	36	56	3
Lower					
1L	.15	32	25	42	3
2L	.20	48	41	62	4
3L	.25	50	43	67	4
4L	.15	50	20	150	29
5L	.20	24	20	28	2
6L	.25	40	33	49	3
7L	.15	34	27	39	2
8L	.20	38	32	45	3
9L	.235	49	37	61	5
10L	.15	491	338	629	59

Figure 6-142. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.033



Mach No. = .802
Altitude = 34 776 ft
C_L = .397
β = -0.3 deg
α_B = 2.01 deg
$N_{1_{E2}}$ = 3581 r/min



Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	30	25	35	2
2U	.20	38	31	46	3
3U	.25	46	37	54	3
4U	.30	38	32	44	3
5U	.20	8	8	8	0
6U	.25	35	32	39	2
7U	.30	38	32	45	3
8U	.25	37	31	45	3
9U	.20	36	29	42	3
10U	.15	37	29	45	3
Lower					
1L	.15	41	33	49	3
2L	.20	54	46	67	4
3L	.25	47	38	58	4
4L	.15	427	256	568	64
5L	.20	22	18	26	2
6L	.25	39	32	49	3
7L	.15	48	33	172	22
8L	.20	39	33	49	3
9L	.235	51	38	65	5
10L	.15	39	32	48	3

Figure 6-143. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.034

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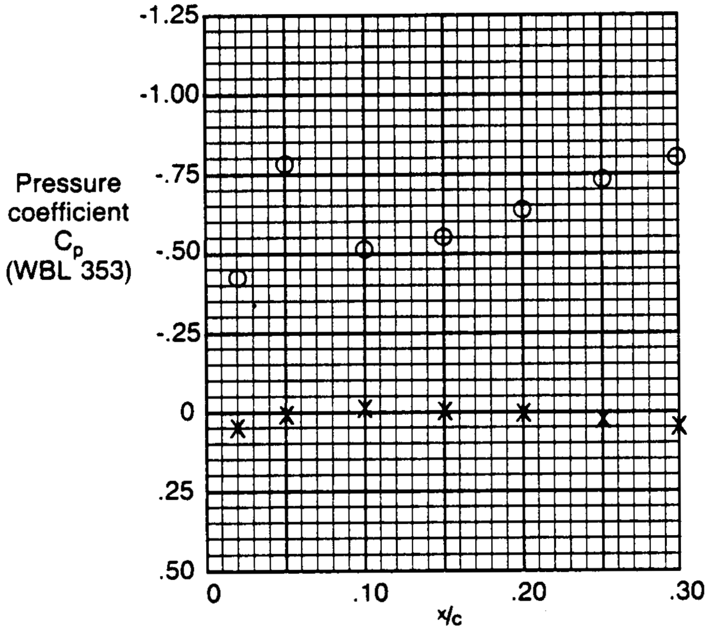
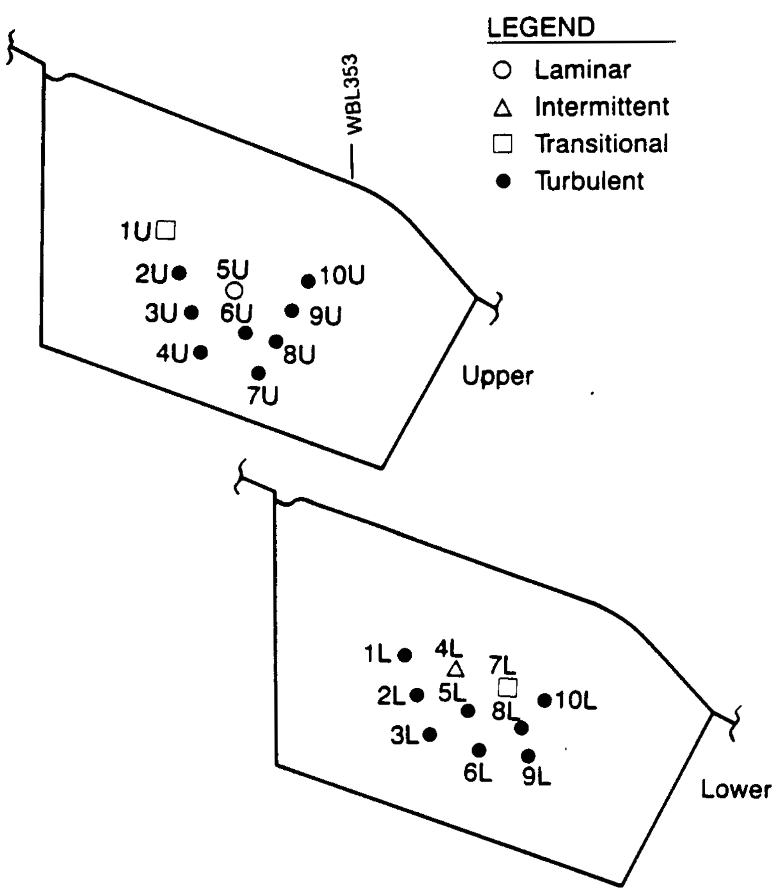
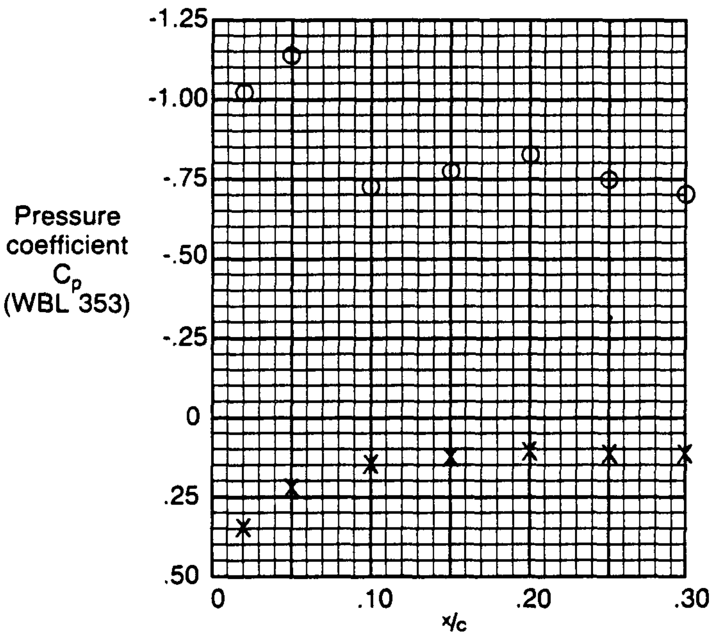


Mach No. = .802
Altitude = 37 569 ft
C_L = .457
β = -0.2 deg
α_B = 2.41 deg
$N_{1_{E2}}$ = 3648 r/min

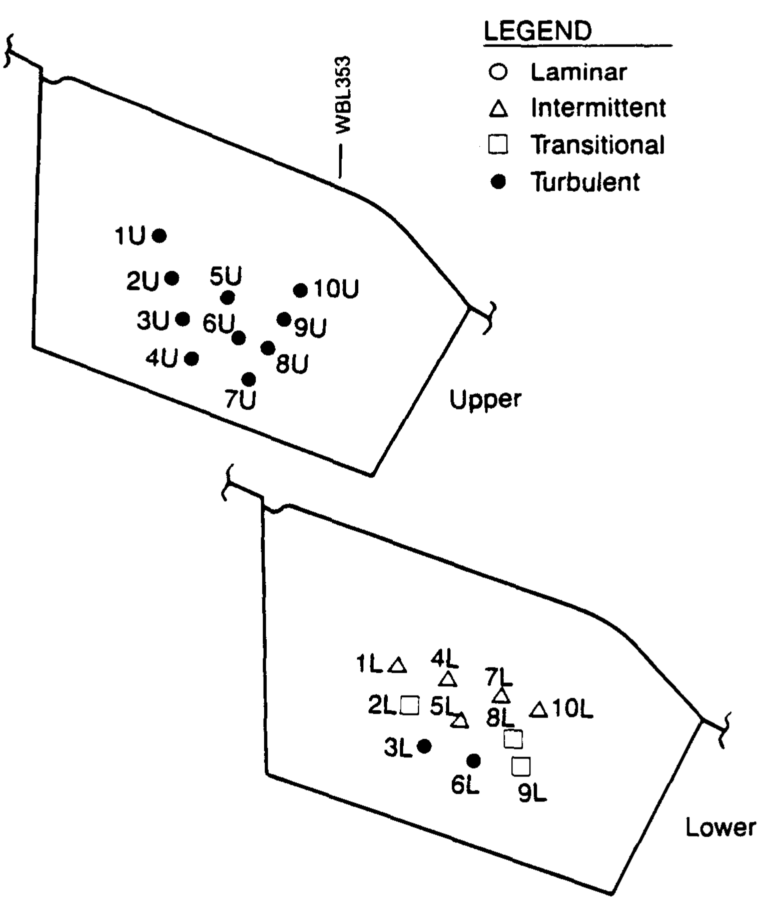


Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	315	274	408	22
2U	.20	36	31	43	2
3U	.25	44	35	53	3
4U	.30	37	32	46	2
5U	.20	8	8	9	0
6U	.25	34	29	39	2
7U	.30	40	33	53	3
8U	.25	40	33	48	3
9U	.20	36	28	45	3
10U	.15	37	30	46	3
Lower					
1L	.15	32	25	42	3
2L	.20	43	35	54	4
3L	.25	42	36	53	3
4L	.15	40	18	190	27
5L	.20	23	19	26	1
6L	.25	35	29	40	2
7L	.15	427	300	584	54
8L	.20	37	31	51	4
9L	.235	49	37	59	5
10L	.15	36	31	48	3

Figure 6-144. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.037

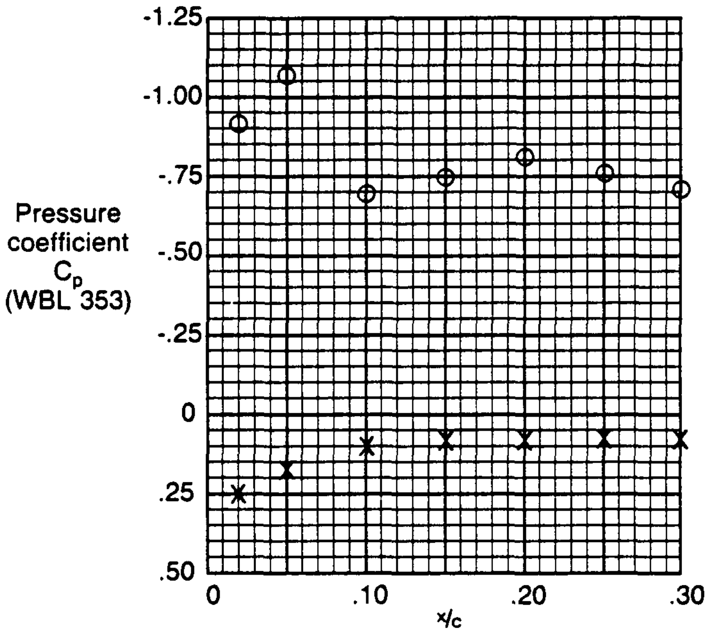


Mach No. = .702
Altitude = 33 024 ft
C_L = .478
β = +5.0 deg
α_B = 3.59 deg
$N_{1_{E2}}$ = 4061 r/min

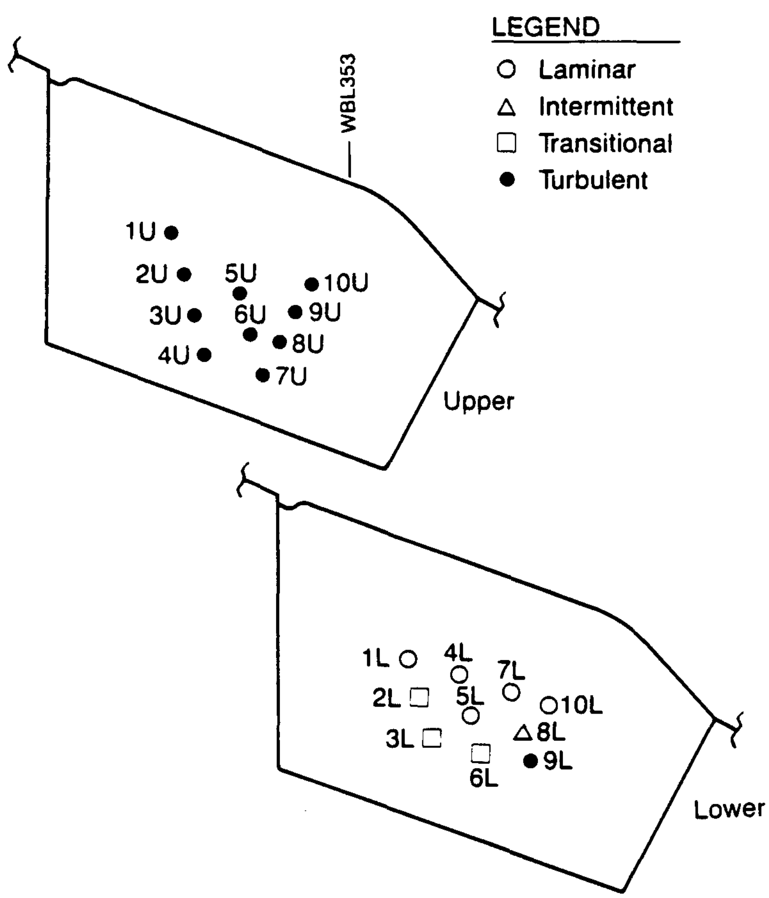


Hot film no.	x/c	RMS output mV Avg	Min	Max	Std dev
Upper					
1U	.15	46	35	54	3
2U	.20	48	41	61	4
3U	.25	59	47	72	5
4U	.30	69	58	85	5
5U	.20	63	54	78	5
6U	.25	66	55	81	5
7U	.30	66	54	81	5
8U	.25	62	49	77	6
9U	.20	51	42	63	4
10U	.15	48	40	58	4
Lower					
1L	.15	74	14	454	94
2L	.20	203	34	524	154
3L	.25	43	34	152	12
4L	.15	31	10	420	68
5L	.20	42	10	242	57
6L	.25	42	29	210	28
7L	.15	27	11	492	64
8L	.20	207	34	481	128
9L	.235	58	35	469	49
10L	.15	55	10	601	112

Figure 6-145. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.039



Mach No. = .711
Altitude = 32 961 ft
C_L = .463
β = +4.8 deg
α_B = 3.14 deg
$N_{1_{E2}}$ = 2406 r/min



Hot film no.	x/c	RMS output mV			
		Avg	Min	Max	Std dev
Upper					
1U	.15	43	33	52	4
2U	.20	48	39	56	4
3U	.25	55	47	65	4
4U	.30	69	57	85	6
5U	.20	62	52	76	4
6U	.25	62	51	79	5
7U	.30	66	55	83	6
8U	.25	59	48	70	5
9U	.20	49	39	64	5
10U	.15	45	38	53	3
Lower					
1L	.15	6	2	22	3
2L	.20	72	11	521	111
3L	.25	57	33	265	37
4L	.15	6	4	10	1
5L	.20	6	6	7	1
6L	.25	65	28	231	35
7L	.15	6	5	7	1
8L	.20	68	7	526	117
9L	.235	52	37	156	19
10L	.15	5	5	6	0

Figure 6-146. Pressure and Hot-Film Data—Flight 4, Condition No. B1.00.0053.040

7.0 REFERENCES

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15. Supplementary Notes

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16. Abstract

A flight test program was performed using the Boeing 757 flight research airplane to investigate the effect of noise from wing mounted engines on laminar boundary layer transition. An NLF glove was installed on the right wing panel just outboard of the engine. The extent of laminar flow on the glove was measured as a function of engine power setting for a range of flight conditions. A combination of surface and probe microphones was distributed over the upper and lower wing surfaces to measure sound spectra.

The flight test program was completed in June 1985 and the results of preliminary analysis indicate that a maximum of about 29% of chord laminar flow was obtained on the upper surface and about 28% on the lower surface (at a high sideslip condition). The engine speed was varied from about 2600 (idle) to about 4500 (maximum continuous power) r/min. This produced changes in sound pressure level up to 20 dB on the lower surface. On the upper surface, the noise levels were independent of engine power but sensitive to airplane Mach number. No effect of engine power setting on upper surface transition location was observed, and only a small forward movement of the transition location on the lower surface was observed at the high power settings.

Volume I of this report contains the program description and data analysis. Volume II is a compilation of all of the flight test data.

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